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and The AIRCRAFT ENGINEER

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The Outlook

Scouting for Raiders

MANY times in the past *Flight* has expressed the view that even if it were decided to give up the idea of passenger airships, the Navy ought to build large rigids as scouts for the trade routes across the ocean where they would be out of the range of shore-based aeroplanes. The case of the *Emden* in the last war was instanced. It took a lot of scouting by numbers of cruisers before that raider was run to earth and destroyed by a cruiser of the Royal Australian Navy. Apart from the value of the ships which she sank, the cost of hunting for the *Emden* was enormous. Had we then been able to use an airship for the hunt, the raider would probably have been found in a fraction of the time and at a fraction of the cost.

The same situation has arisen again. One, and probably two, of the German "pocket battleships," the *Deutschland*, and most probably the *Admiral Scheer*, are now at large. They have been raiding in the Atlantic and there are surmises that one of them may have rounded the Cape into the Indian Ocean, the scene of the *Emden's* exploits. If the Navy now possessed rigid airships which could carry aeroplanes, the task of hunting for the raiders ought to be much simpler than it actually is. There are mooring masts at Cardington, Ismailia and Karachi, and we believe that the mast at Montreal is still standing. From those bases it would be possible to patrol most of the trade routes in the Atlantic and Indian Oceans with a prospect of speedy success and at much less cost than is involved by the use of cruisers. Of course the appropriate warships would have to be brought up to destroy the raiders when found, but the first and most difficult problem is to find them.

We cannot start building airships now in the middle of a war, but it behoves us to look ahead and learn from experience.

Composite Reconnaissance?

IN the meantime, one would imagine that the composite aircraft principle might well be adapted to long-range scouting for sea raiders. It seems that, for the time being at least, there is no need for very long-range bombers, and so the use of aircraft having what one might term abnormal range is not called for on land. But the ultra long range of the upper component of a composite aircraft should be capable of useful work over the oceans.

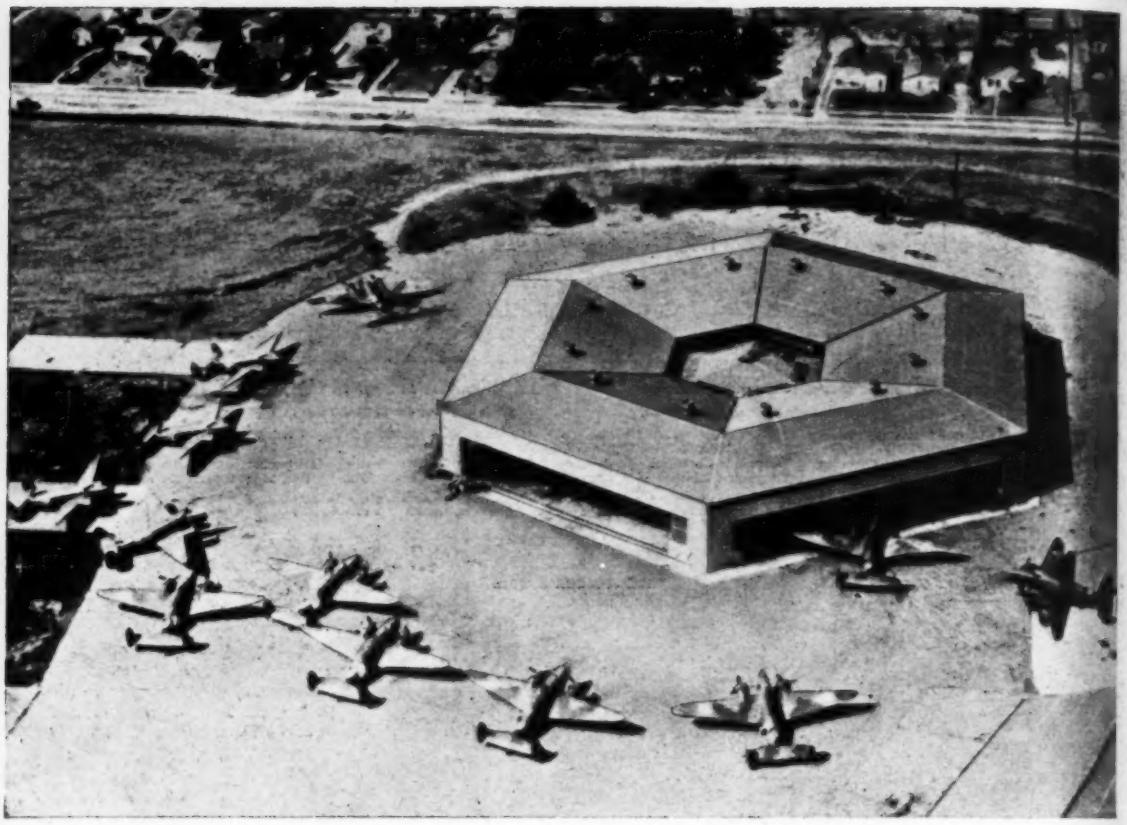
The *Mercury* as it stands would probably not be suitable, but it should not take very long to produce a modified version capable of 4,000 miles' range at the very least. Such a craft, or rather a number of such, for one would obviously use several launched successively from the same lower component, would be capable of scouting over a huge area of ocean, and would return to its base after each flight.

Astronomical navigation has now reached a high degree of accuracy, and Capt. Bennett, to mention but one pilot with experience, has shown that it can be applied in practice. A number of sea scouts so equipped and carrying well-trained crews should be capable of searching the oceans by zones, and should thus be of the very greatest value to the Navy in locating and reporting the position of commerce raiders.

Refuelling in flight, of which Sir Alan Cobham writes this week, would be another possibility.

Munitions from America

PRESIDENT ROOSEVELT has at last persuaded the Senate of the United States to revoke the Neutrality Act to the extent of allowing belligerents to buy munitions of war provided that they pay cash and transport them in their own ships. The House of Representatives had passed a similar Bill some months ago, though it was thrown out by the Senate, so that



READY TO GO: Lockheed Hudsons awaiting repeal of the Neutrality Act at Alhambra, California.

now it is certain that the Lower House will lose no time in doing the same again. This action is a very practical demonstration of sympathy with the cause of the democratic Powers, and ensures to Britain and France an immense reservoir of munitions to supplement their own production.

So far as aircraft go, it is probable that the lifting of the ban on sales will be of more immediate benefit to France than to Britain. Political difficulties prevented the French aircraft industry from undertaking large-scale expansion at the time when the British industry was already expanding. During the past year the French manufacturers have made great headway in putting this right, but, as everyone knows, Rome was not built in a day, and aircraft factories likewise will not rise fully equipped at the waving of a magician's wand. Excellent as are the quality of the types which French designers produce, the great immediate need is quantity. Already the French pilots have been doing great work with Curtiss fighters, and doubtless further large supplies of American aircraft of the highest quality will be very welcome.

To say that does not mean that the aircraft industry of the United States is in a position to provide unlimited numbers straight away, but no doubt the factories have been preparing for the lifting of the ban and have also been considering future prospects. In the meantime preparations in our Dominions have been steadily going ahead.

We cannot be too thankful that our own expansion started no later than it did. But for Lord Swinton and the "drive" he started, we might now be in very urgent need of aircraft from the U.S.A.

Cold Comfort

RECENT reports of the work of the R.A.F. over Germany indicate that *Flight* was right in uttering a warning, a couple of years ago, about the lack of comfort for the crews of Service aircraft. According to these reports, the intense cold encountered during reconnaissance raids over Germany was such as to make some of the crews almost give in and return to their bases.

So far as can be gathered the British aeroplanes were not on this occasion attacked by fighters. That was a piece of luck for which doubtless they were duly grateful. But the point is that if they had been attacked they would not have been at 100 per cent. fighting efficiency. No man can give of his best if he is numbed by cold. It is not merely that physically he is hampered by losing the delicate sense of touch required for the efficient execution of his duties. Mentally he is slowed down and cannot be expected to act with that instantaneous decision which may often mean the difference between victory and defeat.

The crews of bombers are the greatest sufferers, not only because their duties are such as to require team work between different members, but also because, in the very nature of things, their flights are likely to be of much greater duration than the flights of fighters. As we said at the time we first raised the subject, it is all very well to insist on performance, but it is quite conceivable that what is gained on the swings may be lost on the roundabouts. In other words, a crew which is cramped and numbed with cold may be in no condition, physically and mentally, to make full use of the extra performance provided at the expense of comfort.

"H" is for "HEREFORD"—

"Flight" Copyright Drawing

Napier Dagger 24-cylinder H-shaped engines are the standard power plant of the Hereford I bomber now in production at the Short and Harland works. The series VIII version of the Dagger gives a maximum power of 1,000 h.p. at 8,750ft. and is notable for its low cooling drag. For economical cruising the output is 620 h.p. at 12,250ft.

SPORTING SPEED

Notes and Reflections on American Air Racing : This Year at Cleveland

By ROBERT C. MORRISON

SEPTEMBER was certainly a big month. With war and the National Air Races breaking out at the same time one could not ask for more excitement, for there is nothing that compares with the disturbance and commotion of a National Air Race meeting except war. When those half-pint speed burners polished in "go-grease" begin buzzing around the closed course at the Cleveland Municipal Airport there is a thrill every minute. To top things off, Del Bush, a newcomer to the racing game, entered the course in his new Folkerts racer in order to qualify for the Greve and Thompson Trophy Races, which meant he must average 220 and 240 m.p.h. respectively around two laps of the ten-mile closed course. He made one lap all right, but on the second his engine quit, the plane plunging into a clump of trees and bouncing a hundred feet into the air. Bush died almost instantly, and had to be cut from the wreckage. Del had survived a crash in the plane a few weeks previously during tests, and was, perhaps, in too much haste to prepare his machine again for the Races.

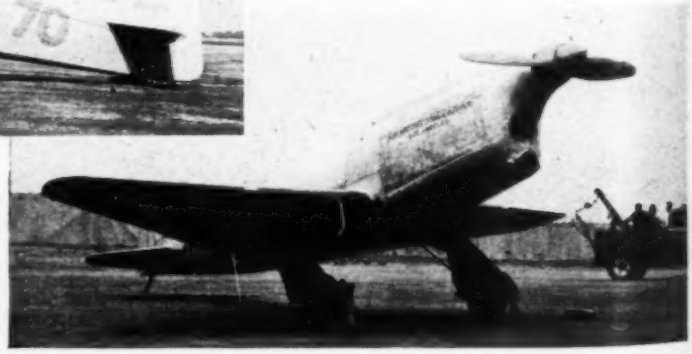
It is a pleasant change to quit war-ridden Europe for a high-pressure American sporting event. Mr. R. C. Morrison, already known to our readers, here discusses in streamlined style the highlights of this year's National Air Races and matters as widely divergent as engine cooling and the omnipresent tragedy which dogs the tail of every one of those astonishing home-made American racing machines

This was the last of three Folkerts racers that had very illustrious but short careers. Harold Neumann produced astonishing speeds in the first one in 1936, which was powered with a four-cylinder Menasco. Later, in Detroit, Roger Don Rae went from one end of the airport to the other with the machine on its belly during the final stages of a forced landing when he had no time to get the wheels down. At the National Air Races that year Rae again landed in somewhat the same manner, only this time with one wheel down. The sad ending came to the aeroplane when Gus Gotch plunged to his death into the San Francisco Bay when the tail collapsed.

Rudy Kling had luck in the second Folkerts by winning the Thompson Trophy Race, at times hitting as high as 279 m.p.h. with the six-cylinder Menasco. A few months later Rudy also was unfortunately killed when the plane dove into the ground under gusty wind conditions at the Miami Races. Frank Haines met the same fate a few feet behind him. The list is getting long—Freddy Lund, Speed Holman, Roy Leggett, Lee Miles, Doug Davis, Lowell Bayles, Russell Boardman, Florence Kligensmith, Ruth Baron, Jim Granger, Cecil Allen, Z. D. Granville, Russ Chambers and Lee Williams are just a few of the more famous pilots that have given their lives for the sake of racing. Earl Ortman, Marion McKeen and the colourful Col. Roscoe Turner have announced their departure from racing this year. Others who have dropped out in the past few years, while they still had their health, are Jimmie Doolittle, Jimmie Haizlip, Benny Howard, Gordon Israel, Harold Neumann, Roger Don Rae, Ralph Bushey, Dave Elmendorph, Joe Jakobsen and George Davey, to name a few. Others of the racing fraternity who have died in planes, though not while racing, are such as Jimmie Wedell, Walter Wedell, Johnny Worthern and Frank Hawks. Clarence MacArthur was forced to jump from a window during a hotel fire which cost him his life, and Roy Minor is about the only racing pilot who avoided a violent death when he contracted fatal pneumonia. Then there is the list of those who have suffered from broken necks and the like which goes way back to the time of Frank Wead, of Schneider Cup fame.

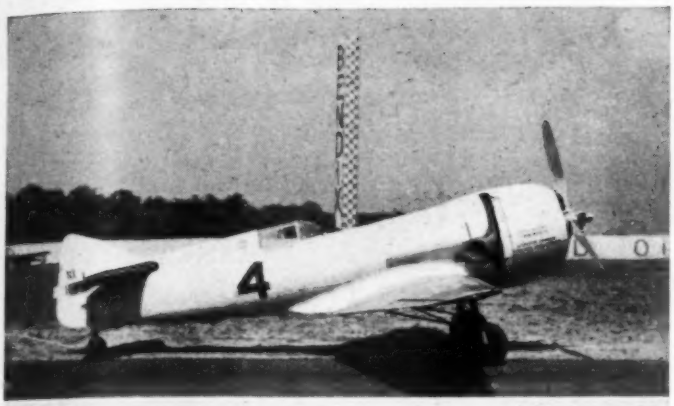
Of those now flying the little Menasco-powered racers, Art Chester is the only "old-timer," with Steve Wittman a close runner-up. Wittman has had many narrow escapes, but Chester, who is one of the originators of the small racer, has had very few mishaps, and an ordinary automobile holds the title of having done the most damage to him so far. Then there is Harry Crosby, who has had more close shaves than any other human in the business, and even this year he narrowly missed a pylon and a grandstand to make a dead-stick landing at the field. But the beginners have all had their crashes before they reached success, including Tony LeVier, who is now foremost among race pilots. Racing is a very dangerous game, to say the least, and the odds are against the pilot from the start. In spite of this fact, there are always pilots willing to risk their lives just for the thrill and the small amount of fame and money they get out of it.

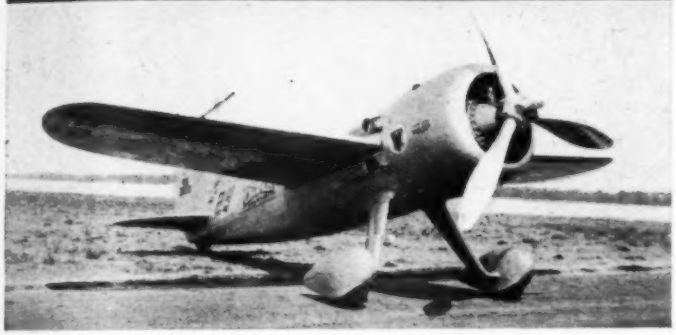
Perhaps many of the names mentioned above are familiar to you, others may not be, but they give one a bird's-eye view of the extent of American air racing, which has had a colourful background, though sorrowful in spots. Publishers in general have missed their cue badly in not "playing up" air racing as they might have, because in it is stored a wealth of material that would be of great interest to everyone. Most American aviation publications have harped on the one subject that the racing airplane has offered nothing to the technical advancement of the airplane, and for that reason have almost



Described by Mr. Morrison as "the very fastest Menasco-powered airplane ever built," Tony LeVier's monoplane (above) was first designed by Kieth Rider and later redesigned by William Schoenfeld.

The Crosby CR-4 (right) has a 260 h.p. Menasco. It averaged 244 m.p.h. in the Thompson race.





The Marcoux-Bromberg (above) was used this year by Earl Ortman to fly his last race. Below is Roscoe Turner's Laird with a Pratt and Whitney Twin Wasp Engine.

ignored the National Air Races entirely. Is technical advancement all that matters? The National Air Races has certainly become *the* meeting place of the aviation industry's personnel, has provided three days of utmost pleasure to everyone that attends, and as long as it remains the huge financial success that it has been, the Races will always be an important highlight in American aviation.

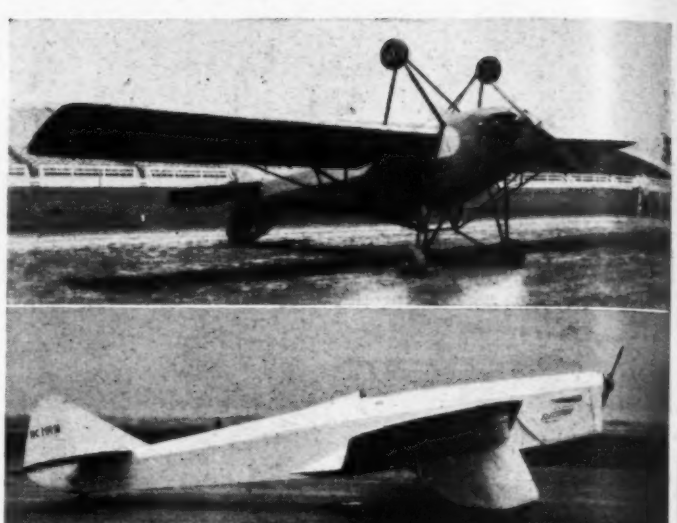
Names like Thompson Products, Bendix, Kendal Oil have found the Races to their liking from the publicity standpoint, and the B.G. spark plug has proven its ability in many a racing plane. Technical developments that have been produced by the race job have been overlooked by the American aviation Press. Would it not be considered a very spectacular engineering achievement to develop a six-cylinder, inverted, in-line, air-cooled engine ordinarily rated at 260 h.p. continuously to turn 1,000 r.p.m. more than it was originally designed for the duration of 300 miles or 30 laps around a very tight ten-mile closed course at an *average* speed of 272 m.p.h.! That is what William Schoenfeldt did this year in the design of the Schoenfeldt *Firecracker*, with, of course, a good portion of its success contributed to its pilot, Tony LeVier.

The *Firecracker* consistently hit top speeds throughout the Races, qualifying at 277 m.p.h. around two laps of the ten-mile course and doing 271 m.p.h. in the Greve Trophy Race when it had finally to drop out at the eleventh lap because of engine trouble. It was in the Thompson, however, that it set up its all-time record for Menasco-powered aeroplanes. The secret of its success is the cooling of the engine. The whole principle is the packing of as much air as possible under pressure and passing it by the engine cylinders as quickly as possible with the rush of air speeded up by means of the venturi system. First of all, the propeller has been mounted on an extension shaft with the tapered engine cowl brought out to meet it. A very small opening in the nose supplies all the air that goes to the engine. Careful baffling and balancing of the power plant's moving parts provides cool and smooth-running qualities, and the louvres on the cowl provide the venturi effect of sucking out the hot air.

Two new pursuit interceptors, one of which made an appearance at the National Air Races, are also prime examples of cooling their engines more by means of sucking the air past the cylinders than by forcing it through the nose. One is the Curtiss P-42, and the other is Vultee's new single-place, low-wing speed demon. Both planes have twin row radial engines, completely enclosed, with propellers mounted on shaft extensions. The only air intake is a small scoop, a few square inches in diameter, under the large prop. spinner. The trailing edge of the bullet-shaped engine cowl consists of cooling flaps completely around its circumference . . . and once more the radial engine staves off the in-line engine's threats to better streamlining.

Though Tony LeVier's *Firecracker* was the fastest of the midgets, it is not as graceful as it might be, but Art Chester's mighty little *Goon*, which supplies Tony with most of his competition, is certainly a sleek-looking little aeroplane. It could not quite reach the *Firecracker's* speed this year, but it did manage to win the Greve Trophy while most of the other race pilots looked on. At the sound of the gun the *Goon*, *Firecracker*, *Crosby*, *Eightball*, and the *Miss Los Angeles* were ready to go. Characteristic of the way the *Eightball* was prepared this year, a hasty decision was made not to take the ship off, and thus only

The Keith Rider *Eightball* (top) was not quite ready for the Races. Below it is the Wittman Special (Curtiss D-12) which took fourth place in the Thompson race.



The Murphy "over and under" machine shown on the right is a stunt contraption which can be landed in the inverted position. The engine is a 65 h.p. Continental. The trim monoplane below it will be recognised as one of our Miles Sparrow Hawks. This also turned up at the National Air Races.

four starters reached the scattering pylon. As they turned to make a dash of 20 laps around the race course the engine of *Miss Los Angeles* stopped. Lee Williams, the pilot, did not have enough speed to gain altitude and plunged in among the trees, dying almost instantly. In spite of this crash the three remaining contestants did not hesitate to go on with the ding-dong battle around the pylons . . . . . but the jinx was on this race, for Tony LeVier was forced to withdraw because of engine trouble with the race almost in the "bag." Crosby was having some of his chronic engine trouble, so he made his competition in the form of an altitude flight around the pylons with the airport always within gliding distance. However, his average speed was 164 m.p.h.

Even though there was no competition it was still fun to watch Art Chester fly the course, to see the speed ship whip around each pylon in a vertical turn, skim along the ground and the tree tops, and then whip around the next pylon. The whining noise these racers make is much different from the usual airplane engine commotion and emphasises the speed at which the ships travel. Though Art Chester was welcome to take it easy with no challenger he averaged 263 m.p.h. for the 200 miles, which brought him $9,000. The former record for the race was 250.88 m.p.h. set by Tony LeVier last year.

Because of a rainy Labor Day, the Thompson Trophy Race was postponed for the following day. The star performer was, of course, Col. Roscoe Turner, who put his third winning notch on the Thompson Trophy with a speed of 282 m.p.h., though he needed an extra 1,000 h.p. to beat LeVier's 272 m.p.h. *Miss Champion* was the name of Turner's Laird racer this year (last year it was *Pesco Special*) signifying that the Champion Spark Plug Co. had put up more money than anyone else for the publicity. Roscoe Turner makes a good medium for advertising. Besides the $16,000 Turner won on the Thompson this year, the extras he receives from manufacturers whose equipment he uses swells that sum considerably. Had he gone 2 m.p.h. faster to break his Thompson record which he made last year, he would have netted another $2,000. Though Roscoe had his airplane in better condition than last year, he missed a pylon on the second lap and had to fly wide to find it again, and thus it hurt his average time.

The Thompson Race

The Thompson Race was interesting this year because there were so many racers participating, and only one had to drop out, and even then it was in the latter part of the race. All the planes functioned perfectly, even Crosby's all-metal racer, and a resumé of the average speeds will give one a good idea of the competition:—

(1) Col. Roscoe Turner, 282 m.p.h.; (2) Tony LeVier, 272 m.p.h.; (3) Ortman, 254 m.p.h.; (4) Wittman, 249 m.p.h.; (5) Crosby, 244 m.p.h.; (6) Mackey, 231 m.p.h. Art Chester was forced out.

Compare these speeds with the qualifying speeds made a few days before: (1) Turner, 297.76 m.p.h.; (2) LeVier, 277 m.p.h.; (3) Wittman, 271 m.p.h.; (4) Mackey, 251 m.p.h.; (5) Chester, 268 m.p.h.; (6) Ortman, 244 m.p.h.

Though Harry Crosby finally eliminated all the "bugs" from his very modern little racer and produced first-rate speed, his competition proved to be very stiff, and still he only gained fifth place in the Thompson. Steve Wittman's veteran *Bonzo*, which would be better named as *What's It*, was well up among the leaders throughout the race to gain fourth place.

At the completion of the race Col. Turner announced that he was through with flying in the Thompson and other closed course races, but would still race airplanes, perhaps in the Bendix. He has been racing airplanes for the past twelve years and is now 44 years old. Most of the colonel's time will now be spent developing an aviation school at Indianapolis.

The 1939 Bendix trans-continental dash was the usual "stock plane" race with a new record of 282 m.p.h., established by Frank Fuller between Cleveland and Burbank, California, the same speed that won the Thompson. Arthur Bussey placed second at 244 m.p.h. in the famed Bellanca three-motored racer that finally proved its ability. Those that finished next in line are as follows, all showing good speeds:—

(3) Paul Mantz, Lockheed Orion, 234.8 m.p.h.; (4) Max Constant, Beechcraft, 231.36 m.p.h.; (5) Arlene Davis, Spartan, 196 m.p.h.; (6) William Maycock, Beechcraft, 187.18 m.p.h.

Jacqueline Retires

Miss Jacqueline Cochran was on the starting line warming up the engine for the race when, for some undisclosed reason, she withdrew. Her Seversky, which in the past had been similar to Fuller's, was revamped with a new wing centre-section and integral fuel compartments. The landing gear retracted inwards as on the Seversky P-41 pursuit. A new Hydromatic propeller was in the nose, and all in all the airplane had the best chances of winning the Bendix had it competed.

The planes that were scheduled to attend but did not compete all make interesting reading, and here are a few brief facts about them. Tom Floyd designed a racer this year similar to the late Russ Chamber's, and Bob Bean was to fly it. The sudden urge to get this plane ready in time for the races occurred at a late date, an enigma that has hovered over the racing world for years, and the airplane was being test flown on the West Coast when the Greve Race was under way. Had Tom Floyd designed a rocket ship he still would not have had it at Cleveland on time. But this little job he did design is about as near the rocket stage as a Menasco six-cylinder engine will permit. The area of the wing is only 58 sq. ft. and the landing speed is increased accordingly. If and when this airplane is put in condition so that it will stay on a race course we should see something faster than Tony LeVier's steed!

Al Navotney, aviation school instructor, was rumoured to have prepared a Menasco-powered Wedell-Williams for the races but did not show. George Byers, who was the warm-up pilot of the *Eightball*, may actually get up in the

air in the ship next year when it is completed. It was rebuilt this year with an elliptical plan-form wing like (can we say it?) the Heinkel twin-engined bombers. The fuselage is moulded from plywood and resins in concrete moulds. When the airplane is completed it will feature a constant-speed propeller and built-in wing slots, two new features never before installed on a small racer.

Arlene Davis made a bid to fly Howard Hughes' racer, then Roscoe Turner and finally Vance Breese, but when the start of the race came the ship was still in its hangar with its future destined to be a military career.

Benny Howard's *Mike* was another airplane that had been scheduled to put in an appearance, as had Byron Armstrong's Delgado *Flash*. Their whereabouts is still a mystery. Perhaps they will all be ready by next year.

The usual stunt and exhibition flights were conducted in the usual hair-raising manner, one of the novel features being Mike Murphy's upside-down airplane with a landing gear at top and bottom. The ship could be landed either way, the pilot's seat swivelling to meet the condition. It's a good ship for women pilots. Jess Bristow did precision stunting in a Conqueror-powered Curtiss Hawk which was good, as were the antics of an old Curtiss pusher. It all made four good days of fun.

CANADIAN AVIATION

Toronto as the Aeronautical Centre : Wartime Preparations : Bush Fliers in the R.C.A.F.

By JAMES MONTAGNE

ONE of the first acts of the Canadian Government at the outbreak of the war was to spend about $6,000,000 on thirty-five military aircraft and fifteen training machines.

To acquaint Canadians with new Royal Canadian Air Force equipment, the force had a large exhibit at the Canadian National Exhibition at Toronto from August 25 to September 9, including a Canadian-built Westland Lysander, a Harvard trainer, and a Hawker Hurricane fighter. Aircraft parts, bombs, parachutes, targets, and other equipment were also on display. Officers and men of the force answered questions of the more than 1,500,000 people who saw the exhibit in the two weeks of the show. A flight of fifty of the latest R.C.A.F. aircraft was to have been made over the exhibition grounds during the last week of the show, but was cancelled because of the outbreak of war and the sending of the machines to Halifax.

Toronto is expected to be the aviation centre of the Dominion, what with the expansion there of construction plants, the taking over by the R.C.A.F. of the largest technical school in the Dominion for the training of mechanics and the recent establishment of regional administrative quarters of the R.C.A.F. Commercially, Toronto has been made headquarters of the Government-owned Trans-Canada Air Lines, one of the essential public services, the staff of which is not expected to be affected by war needs, according to Government orders.

* * *

Canadian flying clubs, sponsored by the Government, flew a total of 10,099 hours during the first half of 1939, as compared with 9,845 hours for the same period in 1938.

Aircraft Output

Canada last year increased its output of aeroplanes to 282, as compared with 110 in 1937, according to a report just issued by the Dominion Bureau of Statistics, Ottawa. There were 13 aircraft factories in Canada last year, as against eight in 1937. Value of aircraft produced was $4,000,000, as compared with $1,460,000 the previous year. The industry employed 1,617 persons, as against 608 the previous year, and payrolls were $2,093,717 and $691,934 respectively. Imports of aircraft in 1938 were valued at $2,883,000, as compared with $1,388,621 the year before, and exports were $2,798,770, as compared with $265,000.

* * *

Wartime preparations for the Royal Canadian Air Force include new airport facilities on the Atlantic and Pacific coasts, new training quarters, and more aeroplanes, according to information in the official *Canada Gazette* early in October.

With the outbreak of war Canada placed in quick succession a number of orders for training and fighting aircraft during the first month of war. These were in addition to orders already on the books of aircraft manufacturers. The *Canada Gazette* announced hangars were to be built immediately for seaplanes and landplanes at Dartmouth, Sydney, and Yarmouth, in Nova Scotia, and at Saint John, N.B. New hangars were also to be built at once at Patricia Bay, British Columbia. The winter training quarters at Camp Borden, Ont., used extensively during the last war, are being renovated and steam-heated for use this year.

Numerous Canadian bush fliers have enlisted with the Royal Canadian Air Force, somewhat upsetting routine of the northern air services. Among those who have enlisted are Con Farrell, assistant superintendent of Canadian Airways, Ltd., and Stan McMillan, chief pilot of Mackenzie Air Service. Despite the disturbance to civil aviation made by war enlistments, air services to the northland are being continued. The Government-owned Trans-Canada Air Lines is expanding its service, despite the war, and is expected to have the Montreal-Halifax link of the trans-continental service in daily operation before the end of the year. The airway is continuing its daily services, and plans to speed up its Montreal-Vancouver run. Passengers have been carried only since March 1, 1939, and the first six months of the year show an increase each month. Revenue mileage for the first six months totalled 1,278,626, and more than 96 tons of mail were carried during that time. The airway now has in use fifteen Lockheed Super-Electras, each carrying a crew of three.

Licensed Pilots

At the end of June, 1939, Canada had 708 private pilots licensed, 231 commercial pilots, 194 limited commercial pilots, 150 transport pilots, 683 air engineers, and 2 airport traffic control officers, according to a report just issued by the Department of Transport at Ottawa. There were certificates in force on the same day for 82 private aircraft, 376 commercial aircraft, and 124 airports.

Mail carried on thirty-eight mail services for the first three months of 1939 amounted to nearly 500,000 pounds. The twenty-two light aeroplane clubs in operation in Canada for the first six months flew a total of 10,179 hours, had 2,656 members, 70 aeroplanes in use, 795 members under flying instruction, and graduated 46 private pilots and 10 commercial pilots during that time. (The clubs, during the early part of the war at least, are continuing to train young men for the Royal Canadian Air Force, as arranged earlier in the year, the clubs being paid a grant for each pilot turned out, and being supplied with additional training planes.)

* * *

Fairchild Aircraft, Ltd., Montreal, reported that in its fiscal year ending June 30, 1939, it had made a profit of $28,060, as against a loss of $56,729 in the eighteen months ending June 30, 1938. Net earnings totalled $91,925, up from $10,202. The company at the end of the fiscal year had on hand an order for eighteen Bristol bombers for the Canadian Government.

WAR in the AIR

Heinkel Bomber Brought Down in Scotland : The A.A.F. Pilot Who is in a "Reserved Calling"

A GERMAN attempt at a raid on the Firth of Forth on Saturday morning, October 28, had a spectacular finish. No warning was sounded, in accordance with the decision that it is inadvisable to stop all work whenever a small raid is seen approaching in a direction which does not threaten the civil population of a city, but fighter aircraft of the Auxiliary Air Force immediately went up. The German bomber was a Heinkel 111 carrying a crew of four. The fighters quickly made an interception and the German machine turned off to the south-east without dropping any bombs, and attempted to escape, using every sort of manœuvre, such as coming down low and (to use a Rugby football term) side-stepping. Its efforts, however, were in vain. It was riddled by machine-gun bullets from the guns of the fighters; two air gunners in the rear cockpits were killed and the pilot was wounded. Finally, the Heinkel came to earth on a heather-covered hill in the Lammermuirs to the east of Dalkeith. The pilot and navigator surrendered to a policeman, who was the first man to reach the scene. The German pilot said in excellent English, "We surrender as prisoners of war. Please see to my gunners in the back of the aircraft." As previously mentioned, both of these men were dead. Every part of the German machine was riddled with machine-gun bullets, and holes had been drilled in the two metal propellers. Before the machine crashed, the port engine had ceased to function. As soon as the machine was seen to land the fighters ceased firing. The Heinkel III was described in *Flight* of September 21.

Some civilians have made a protest about the absence of any air-raid warning. The people round Edinburgh do not seem to realise that the decision not to sound the warning is deliberately taken and does not mean either that our warning system has broken down or that the authorities are unconcerned with their safety. In all cases up to date the decision not to sound the warning has been thoroughly well justified.

Herr von Ribbentrop, the German Foreign Minister, made a broadcast speech from Danzig on Tuesday, October 24. It was full of untruths and the object of it seemed to be to persuade the German people that Britain was responsible for the war.

Premier's Review

MR. CHAMBERLAIN alluded to that speech in the House of Commons on Thursday, October 26, and said that he did not propose to waste time by commenting on many details of that performance, but he gave his weekly summary of the progress of the war. The passage which dealt with the Royal Air Force was as follows:—

"During the past week there have been no operations of importance on the Western Front. Minor adjustments in the positions occupied have been made, and the general result is that the French and German forces are now on the line of the common frontier. The steady stream of reinforcements and reserves of material for the British Expeditionary Force continues, and the defences in the British Sector are being continually strengthened.

"In the air, aircraft of the Fighter Command have again been in action. The House is already aware of the attempted attacks by German bombers on the East Coast convoy on October 21. In the morning attack, delivered by six bombers, it is probable that two of the enemy aircraft were destroyed, and in the afternoon attempt, made by two formations of nine and twelve bombers respectively, it is certain that four, and probably that five, were destroyed. On the following day one of two bombers was shot down into the sea near a convoy off St. Abb's Head. None of the ships or escorts in the convoys suffered hurt, nor did any of the Royal Air Force aircraft engaged.

"The work of the units of the Coastal Command is almost continuous. Occasionally it is spectacular and attracts atten-

Brought down at the Scottish village of Humbie, near Dalkeith, this Heinkel 111 bomber was riddled by machine gun bullets. The smaller holes are made by the bullets entering, the larger by them leaving.

THE WAR IN THE AIR (CONTINUED)

tion, but more often it is of a routine kind, and, though no less effective, passes unnoticed. This week there are certain successes to report. Mines in the path of convoys have been detected from the air in time to save the ships in the convoy from danger, and seven U-boats have been sighted. Of those sighted, four have been attacked. There is good reason to believe that at least one of those attacked was severely damaged, and that another was destroyed by naval vessels directed to the scene by the attacking aircraft.

"I should like also to mention the admirable work of the anti-aircraft gunners, who have been continuously at their posts from a date before the war began. It is now known that in the raids on Rosyth and Scapa Flow they brought down two German bombers and there is reason to think that they caused such damage to others as to prevent their reaching home."

A correspondent has sent us an account of a German aircraft's attempt to interfere with a convoy off St. Abb's Head on Sunday, Oct. 22, as mentioned by the Prime Minister in the extract of his speech given above. He says that the sea was choppy with a stiff breeze off the land, and masses of clouds were sailing across the sky at 5,000ft. A German bomber, described as a Heinkel twin-engined machine, was taking cover in the clouds, and a formation of three fighters of the Auxiliary Air Force was hunting it. At last they caught a glimpse of it as it moved from one cloud to another, but that was enough. At once the leader put his nose down and the whole formation went at high speed towards the cloud where the would-be raider had taken refuge. After a while they caught sight of him and each fighter in turn made an attack. The German was soon going down on to the water with black smoke pouring from his engines. The crew were seen to leave their sinking aircraft and take to their collapsible boat. In response to radio messages from the fighters a destroyer was sent to pick up the Germans.

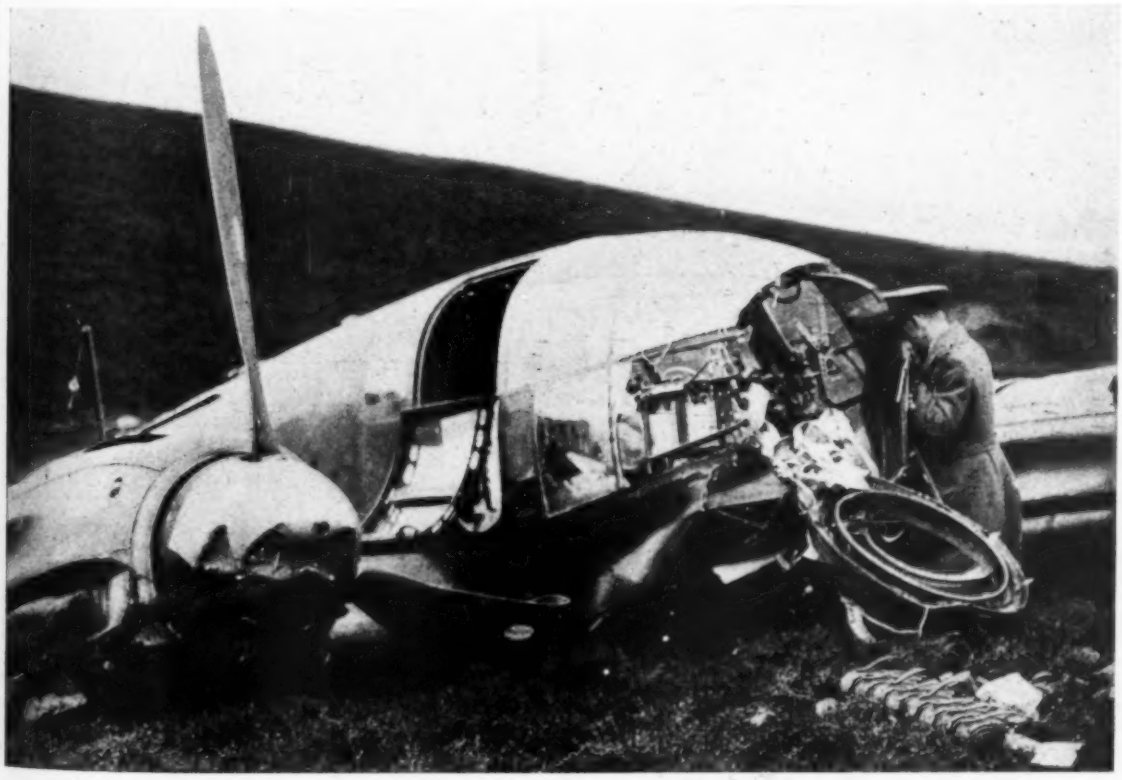
Apropos the fighter squadrons of the A.A.F., a story is going round that one pilot who has shot down two enemy bombers is, in civil life, a mining engineer. He has now discovered that this profession is a "reserved calling" and those authorities which are responsible for these "reserved callings" are anxious that he should leave his squadron and go back to mining engineering. The pilot in question says that he thinks shooting down German bombers is a much more interesting occupation and he proposes to carry on with it as opportunities present themselves.

A message from Copenhagen says that a Messerschmitt fighter made a forced landing near Aabenraa, in Denmark, and that the pilot, one Corporal Bertram, aged 21, has been interned. It is said that a scarlet demon was painted on the fuselage of the machine, but it is not known if this is a squadron marking or a personal device.

Darkness and Composure

SIR JOHN ANDERSON, the Home Secretary, on Thursday, October 26, explained why street lighting cannot be turned off from a central switch as soon as there was danger of an air raid.

He said, "If you switch off all lights when the preliminary private warning is given—that is the first one for officials to stand by—you immediately tell the whole public that there may be a raid, with the resultant confusion. In fact, this preliminary warning may often be given when no raid occurs. On the other hand, if you wait for the full raid warning before switching out the lights, then that is too late. It means probably that hostile aircraft have already, in the distance, seen the glow of the lights. 'Planes travel so swiftly now that this method is too risky. Experiments with street lighting have been made. I thought that a process had been found which would give excellent lighting without showing anything. Alas! The R.A.F. picked out the lights from the air 20 miles away."



Bent and broken, the wreck of the Heinkel III, brought down in the Lammermuirs last Saturday, still remains sufficiently intact to make a close study instructive. The engines are of Junkers direct-injection type.

THE WAR IN THE AIR (CONTINUED)

The experiments were still being made, Sir John added. The aim was a type of low intensity street lighting which would be invisible to raiders and could be left alight even when a raid was in progress.

On Saturday, October 28, a German raider was seen over the Orkney Islands. Fighter machines, presumably from some aircraft carrier, at once took off to hunt for it, but the German promptly turned tail and escaped out to sea. Possibly its object was reconnaissance rather than bombing.

On Monday morning, October 30, enemy aircraft approached our coasts at two points, off the Essex coast and off the North-East Coast. An air-raid warning was sounded in parts of Kent, and, by some mistake, in parts of London. The "all clear" was sounded fifteen minutes later. The Air Ministry announced that the warning was due to unidentified aircraft off Essex flying south, and that fighters went up to investigate. Off the North-East Coast fighters also went up to investigate, whereupon the enemy made off before contact could be made. No shots were fired, and the tales of "eye-witnesses" describing a fight were evidently the result of vivid imaginations. It is possible that single German machines have been approaching our coasts in order to set the warnings going and so interfere with production.

On the Western Front

TURNING now to the Franco-German battle line, more reconnaissance flights have taken place. On Tuesday, October 24, Royal Air Force machines flew by night over Berlin, Magdeburg and Hamburg. The machines were over Hamburg during the broadcast of Herr von Ribbentrop's Danzig speech and the broadcast in that city was hurriedly abandoned. Then on Friday night, October 27, Royal Air Force machines turned their attention to areas in southern Germany. All returned safely. This was the first time that our machines had pushed over southern Germany. After returning to their base they told Reuter's correspondent that as soon as they crossed the German frontier they ran into a blanket of fog, which extended almost from ground level to a great height and they remained in it almost up to the time when they landed. They suffered intensely from cold, and ice formed on the wings and other parts of their machines. One machine turned back shortly after crossing the frontier, but all the rest completed their flight satisfactorily, but what they were able to tell Headquarters as a result is not known.

Reports from the French Armée de l'Air are very encouraging. Up to October 20 no less than 250 reconnaissance flights had been made by day and 74 by night. There were frequent clashes between French escort fighters and German fighters in which the Germans lost 24, while the losses to the French fighters were only 8. The French fighters showed a definite superiority of manœuvre over the German machines. It is stated that more than 200 young Frenchmen are volunteering every day for service with the Armée de l'Air, and production is increasing all the time.

On Saturday last, Marshal of the Royal Air Force Sir John Salmond inspected a unit of the Air Defence Cadet Corps at Hove and is reported to have said to them: "I have been talking to some of the pilots who have been flying over Germany, and they have had extremely little opposition. They told me there is a type of German fighter machine which our pilots believe that the Germans cannot fly at night. The machine has turned out to be unsuitable to a marked degree. It is heavy and so extremely difficult to land at night that only the toughest pilots would undertake to fly one after dark. On one occasion one of our men was over there within 50 or 70 miles of Berlin. Three of these fighters came up and he thought 'now at last I am going to have some fun,' but after a short exchange of firing they soon disappeared."

During the last week or so Germans have been massing divisions of the Army and strong forces of bomber aircraft in the neighbourhood of the Dutch frontier. This movement has caused a good deal of uneasiness in both Holland and Belgium, and was doubtless responsible for the speech of King Leopold in which he said that Belgium would fight if it were attacked and that it was ten times stronger than in 1914. There has been speculation in many quarters as to whether the Germans intend to force their way across Holland with the idea of obtaining convenient bases for submarines and for air attacks on Great Britain.

The U.S. Neutrality Law

THE Senate of the United States has now voted for the repeal of the Neutrality Law, which forbids the sale of munitions of war to belligerents. It is confidently expected that the House of Representatives will also pass this measure within a day or two, as that body had previously voted for the repeal of the Act. It will then be permissible for the Allies to buy aircraft and other munitions in the United States provided that they pay cash for them and carry them away in their own bottoms. Before the war the Air Ministry had placed an order for numbers of Hudson aircraft (Lockheed Fourteens), but not all the machines were delivered before war broke out. So soon as the ban is removed the residue of this order will doubtless be delivered. It does not follow that the Air Ministry will necessarily place any large orders in America immediately, but it is probable that the French will find a useful source of supply in the United States.

The Government of Southern Rhodesia has offered to bring their single air squadron up to full strength, to raise two additional squadrons, and to maintain the three squadrons in the field on any front. The British Government have expressed their warm appreciation of this offer, which has been gratefully accepted. It is proposed that Southern Rhodesia shall at the outset be responsible only for the elementary training of its Air Force and that the British Government shall make available any further equipment necessary for this purpose. The officer commanding the Southern Rhodesian Air Force is to leave for England soon to discuss with the Government the detailed programme for the formation and equipment of the new squadrons and the most rapid and economical means of getting them into action.

His Exalted Highness the Nizam of Hyderabad has presented the Air Ministry with £100,000 as a contribution towards the cost of the air war.

A Pinnace Adventure

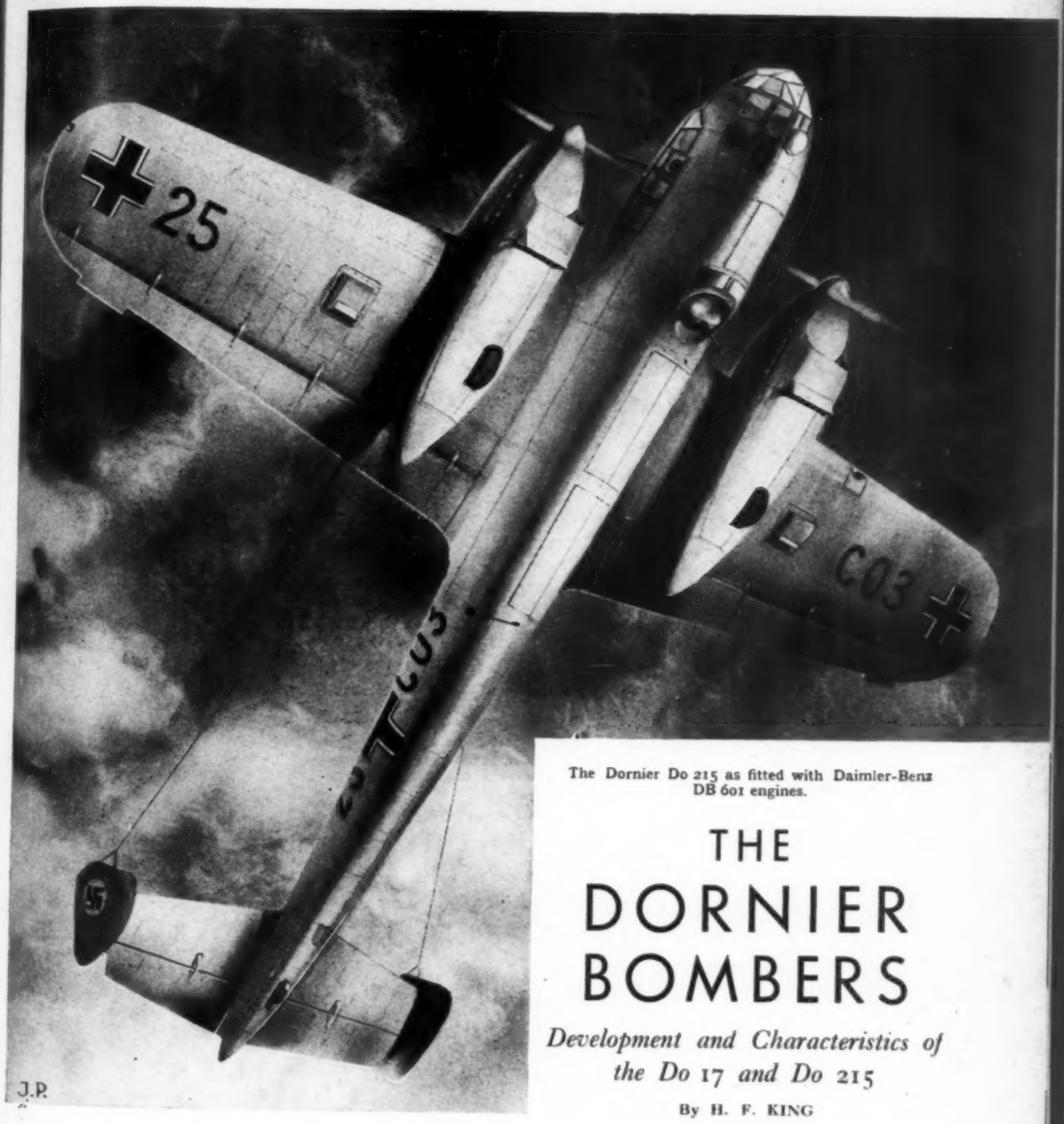
A small R.A.F. pinnace with a crew of seven was missing for four days in a storm, but finally arrived back safely at her base. The craft had been sent out to rescue a flying-boat which was reported to have made a forced landing on the sea, but when it drew alongside the flying-boat it found that help was not needed. The pinnace did not arrive back next morning as had been expected, but announced by wireless that she had spent the night at anchor. Then the weather changed and a storm came on with very bad visibility. Aircraft were sent out to locate the pinnace, but could not see her. After a while the wireless on the boat failed and then no further communication was possible. The only food on board was a small quantity of iron rations and a keg of water. On the fifth day the pinnace returned to her base and the Captain reported: "Sorry we're late, sir, but it's been a bit thick out there these last few days."

Sale of Aircraft

ATTENTION is called in Air Ministry Notice to Aircraft Owners and Ground Engineers No. 31 of 1939, to the fact that the sanction of the Secretary of State for Air is required for the sale, transfer, letting and charging of British aircraft in the United Kingdom and Colonies. The same also applies to aircraft the registration of which has been cancelled.

Anyone wishing to sell, transfer or let Aircraft should apply to the Director-General of Civil Aviation, Air Ministry, Bristol, on C.A. Form 132.

Somewhat similar restrictions apply to airframes, engines and airscrews, for which, however, C.A. Form 135 should be used.



The Dornier Do 215 as fitted with Daimler-Benz DB 601 engines.

THE DORNIER BOMBERS

Development and Characteristics of the Do 17 and Do 215

By H. F. KING

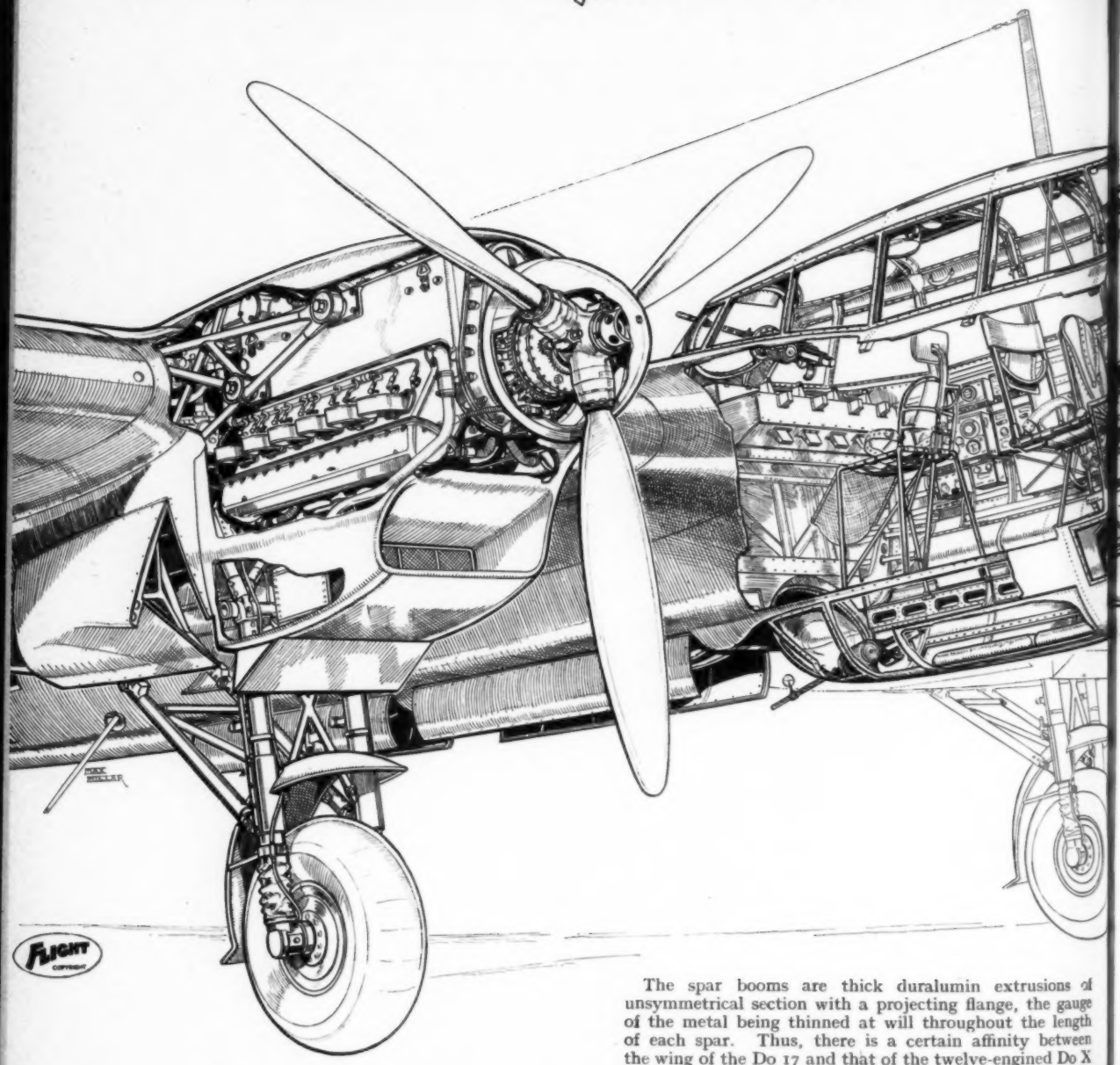
ANYONE who, like the writer, has browsed round the Dornier "museum" at Friedrichshafen will agree that this old German company has a distinguished historical background of metal-aircraft construction. For the past five years or so it has been building bombers and flying boats for the German Air Force; this article will review the former.

Production and flying activities centre round Manzell, Allmansweiller and Löwenthal on the outskirts of Friedrichshafen, though Dornier bombers have also been constructed in series by other German manufacturers, notably Henschel.

Dornier's first tangible contribution to German rearmament was the Do 23 bomber which, together with the militarised Junkers Ju 52/3m, was a standard type until two or three years ago, after which it was relegated to training duties.

The Do 23 was a high-wing monoplane with a fixed undercarriage and two B.M.W. VI upright vee-twelve engines. The plan form of the wing was remarkable, as the leading edge had a marked curve while the trailing edge was straight. At a flying weight of 19,300lb. the top speed was about 160 m.p.h., which permitted manual operation of the gun mountings in the nose, on top of the fuselage and below the fuselage, the upper mountings being unprotected.

By 1936 there were whispers of a very fast and efficient bomber then being introduced. For a considerable time



details of this aircraft were completely secret, but when the first pictures appeared it was seen that, in side elevation, the fuselage was extremely graceful. This characteristic, which caused the machine to be dubbed the "flying pencil," was accentuated by the long nose then fitted, though this feature as we shall see, was subsequently modified very considerably.

The various models of the Do 17 differ only in the design of the nose, the installation of the military equipment and the power plant, so that the following structural description will apply in the main to all varieties.

The slimness of the fuselage is apparent only in side elevation; when seen in plan it appears quite normal, and, in fact, in the centre portion unusually broad, due to the sloping sides. The cantilever wing intersects the fuselage in such a manner that the machine is best described as a "shoulder wing" type, or what the Germans call a *schulterdecker*. It is of two-spar design, the covering being part metal and part fabric. In plan form it is of characteristically low aspect ratio with a gentle taper and rounded tips.

The spar booms are thick duralumin extrusions of unsymmetrical section with a projecting flange, the gauge of the metal being thinned at will throughout the length of each spar. Thus, there is a certain affinity between the wing of the Do 17 and that of the twelve-engined Do X flying boat. The girder-type spar bracing utilises lightened duralumin members of broad channel section, their ends being flanged inward and anchored on substantial plates. The main ribs are built up of duralumin channel sections, while intermediate ribs have tubular bracing. Fuel tanks are slung between the spars on the inboard sections of the wing.

Fabric covering extends between the spars on the lower surface, the remaining covering being smooth, flush-riveted metal.

The trailing edge is of special formation to provide a slot effect for the flaps, which extend between the ailerons and the fuselage and have set-back hinges. Flap operation is mechanical. The ailerons are likewise slotted and are of high aspect ratio. They incorporate trimming tabs.

In section the fuselage starts off more or less oval, but quickly changes to a flat-bottomed structure which is about twice as wide at the top as at the bottom, returning once more to elliptical and circular

section as it nears the tail.

Built-up frames and intermediate stiffeners are used in the fuselage construction, being notched to receive the channel-section stringers, the lips of which are flattened where required at the intersection with a frame. The frames are most substantial, of course, in the vicinity of the wing. At the forward end the covering is applied in very large formed panels.

On the extremities of the tailplane are the twin fins and aerodynamically balanced rudders, the tailplane having holes to receive the mass-balance weights of the elevators. Each half of the undercarriage retracts hydraulically with a rearward motion into an engine nacelle, leaving a section of the wheel exposed, though "clam-shell" doors fair off the bottom of the nacelle. The tail wheel retracts during the final stage of the disappearance of the main gear.

For normal bombing duties a crew of three is carried, being grouped in the forward part of the fuselage. The pilot's seat is offset to port and should permit changing pilots in flight. Internal equipment which one noted in a German Air Force machine at Allmansweiller includes an automatic pilot, two-way wireless and D/F equipment. The top gun position corresponds roughly with the leading edge of the wing, and is adequately shielded. The mounting itself is not power-operated.

Nose armament varies, and several photographs have appeared of Do 17s carrying no front gun at all. The Yugoslav versions have two fixed guns in the front cowling, but it seems that the standard German installation is a single gun mounted to fire through the starboard side of the cockpit windscreen. This weapon can be clamped in a fixed position, in which case the pilot uses the ring and bead sights provided, or can be operated as a free gun by the occupant of the second seat, though the "freedom" obtained must be very limited. Provision can be made for a downward-firing gun to be mounted on the floor of the fuselage.

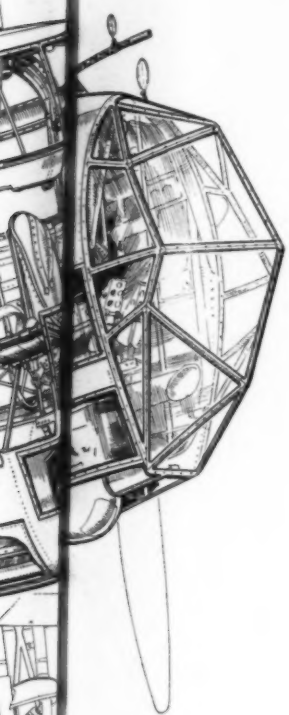
Bombs are carried horizontally in the bottom of the fuselage behind the plane of the front spar, the wheel for opening the traps being in the fore part of the fuselage, where it is accessible to the pilot and bomb aimer. External racks may be attached to the sides of the fuselage. A typical bomb loading would be about 1,500lb.

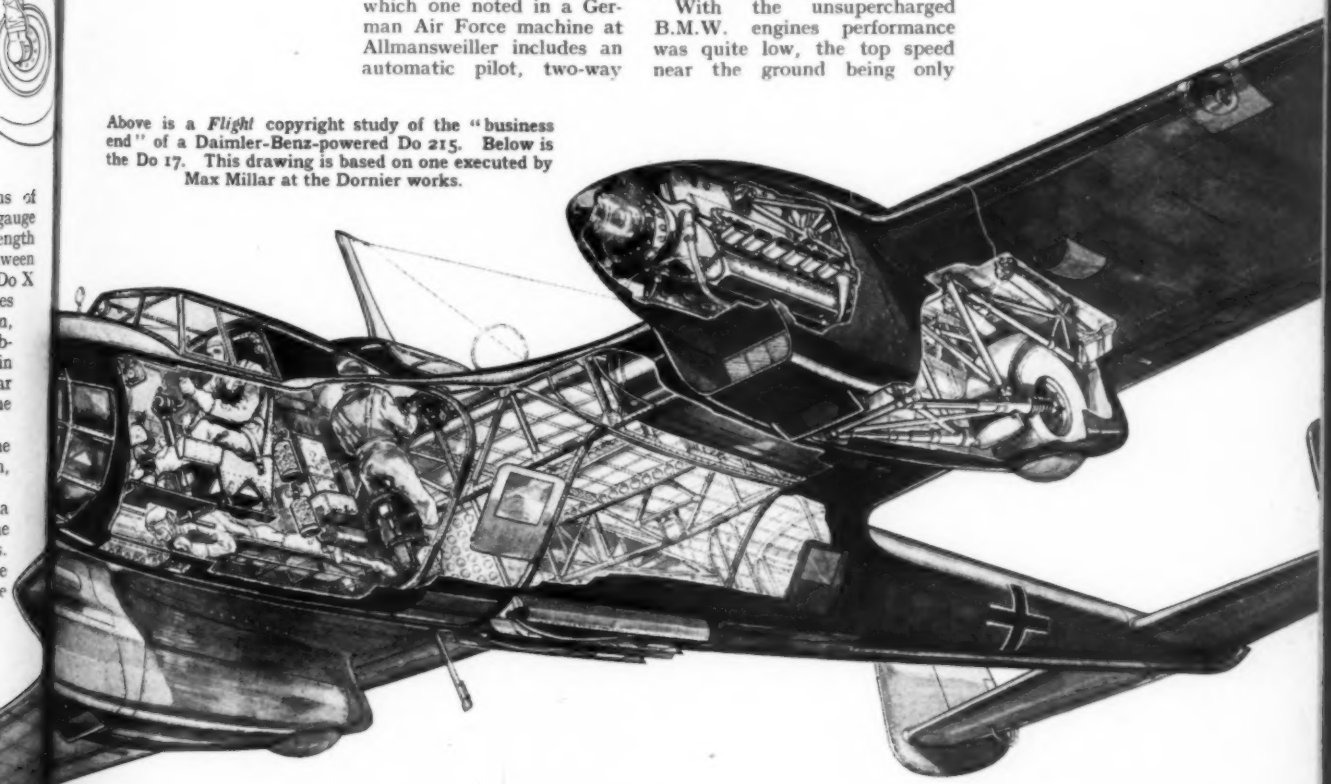
Nose Design

The first Do 17, as already stated, had a long, pointed nose without transparent panelling. Next came two modified designs, one hemispherical (this was adopted as standard for aircraft of the *Luftwaffe*) and one longer and more angular with transparent panelling in the lower section. The latter was used on the first Do 17 prototype to be fitted with Daimler-Benz engines and on the Yugoslav machines.

Do 17s of the first series delivered to the *Luftwaffe* were fitted with two unsupercharged B.M.W. VI prestone-cooled engines, giving a maximum output of 750 h.p. apiece. These units did not lend themselves well to a good nacelle entry, the thrust line being well below the cylinder banks. With the Daimler-Benz DB 600 inverted-vees as specified for later machines smoother lines were obtainable. In both cases the radiator is mounted below the crankcase. The standard airscrew is a three-bladed variable-pitch V.D.M.

With the unsupercharged B.M.W. engines performance was quite low, the top speed near the ground being only





Above is a *Flight* copyright study of the "business end" of a Daimler-Benz-powered Do 215. Below is the Do 17. This drawing is based on one executed by Max Millar at the Dornier works.

A Do 215 as powered with radials which may be B.M.W. 132 Dc's or Bramo Fafnirs.

about 235 m.p.h. The introduction of the B.M.W. 132Dc and Bramo Fafnir radials gave a much improved performance as, of course, did the fitting of the Daimler-Benz DB 600s.

Although the Dornier concern has been fairly liberal in releasing structural particulars, performance and weight data are very scanty and, for that matter, on the optimistic side. The following figures might apply to the machine as fitted with two Daimler-Benz DB 601 engines. Standard service aircraft would not be so efficient: Disposable load, 6,600lb.; service ceiling, 29,500ft.; maximum speed, 310 m.p.h.; range, 1,550 miles.

With the exception of length, the following dimensions are common to all Do 17 models: Span, 59ft.; length, 55ft. 6in.; wing area, 592 sq. ft.

Do 215

Shortly before the war the Dornier Company announced the development of an improved version of the Do 17, which, for some obscure reason, bore the works number Do 215. The wing, fuselage, tail, power plant installation and undercarriage of this machine are similar to those of the earlier model, but the accommodation of the crew has been revised.

Like the Do 17, the new machine can be fitted out as a short-range heavy bomber; a long-range machine with a smaller bomb load; for long-distance reconnaissance; for ground attack work and even as a fighter, though it is not used in the latter guise in the German Air Force. It may be distinguished from the Do 17 by the "swollen" nose section which accommodates the crew.

The extreme nose portion is composed of "facets" of transparent material which not only light the bomb aimer's position but improve the pilot's view in a forward and downward direction. In this respect the machine bears a marked resemblance to the "short-nosed" version of our own Bristol Blenheim. Unlike the Blenheim, however, the Do 215 has its pilot's windscreen and cockpit enclosure external to the main lines of the fuselage. Actually, this cockpit enclosure is extended aft to a point just above the leading edge of the wing and terminates there as the upper gun position. On the underside the nose portion extends aft to a point just forward of the leading edge and there embodies with the lower gun mounting.

In all there are three machine guns, one protruding through the starboard panel of the windscreen, the second on a manually operated pillar-type mounting in the upper position already mentioned, and the third (in a hemispherical mounting) firing below the fuselage.

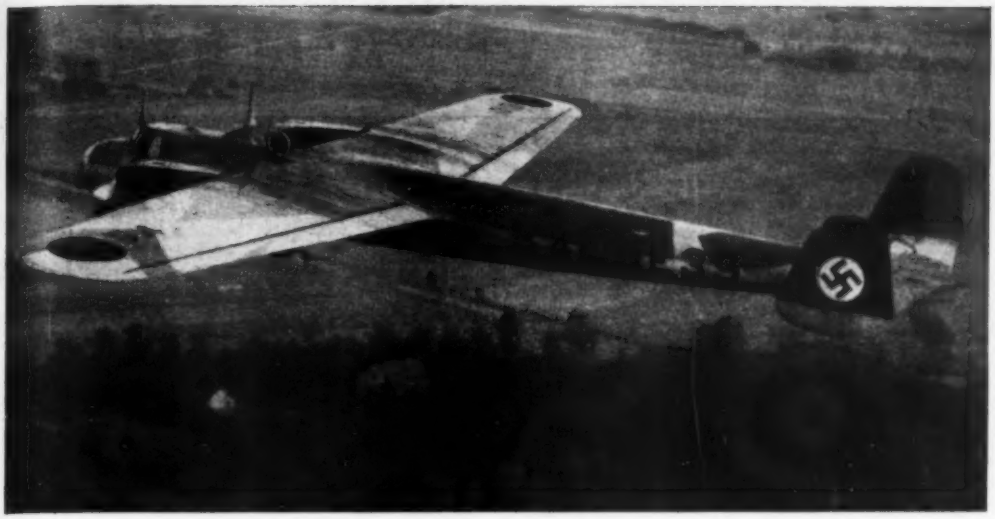
Bomb stowage arrangements are similar to those on the Do 17, the horizontally stowed bombs falling through two sets of trap-doors in the flat-bottomed fuselage.

In addition to the pilot there is the bomb-aimer, who can use the "windscreen" gun as a free weapon, and two other members of the crew who look after navigation and wireless and man the upper and lower rear gun positions. The upper gun is fired from the sitting position, but the lower one is operated from a kneeling attitude or with the gunner lying prone on the floor.

Three types of engine are normally specified. Two of these are radials—the B.M.W. 132 Dc and the Bramo

A radial-engined Do 17 showing the field of fire of the top gun.

"Flight" photograph



The obliterated markings indicate that this Do 17 (B.M.W. VI's) was taking part in manoeuvres.

Fafnir—and are installed in the usual long-chord cowlings with controllable gills. The best performance is obtained with Daimler-Benz DB 601 inverted vee-twelve liquid-cooled units, but in view of the poorer streamlining of the aircraft in comparison with the Do 17, it is difficult to see why the speed, even with these power plants, should be as high, or higher, than that of the Do 17, as claimed.

Figures issued just prior to the war indicate that the all-up weight is 18,960 lb., the disposable load 7,270 lb., and the range 1,860 miles. Despite the fact that the wing loading is higher (about 32 lb./sq. ft.) it is claimed that the landing speed is the same as that of the Do 17 (68 m.p.h.); this is particularly surprising as split flaps have been fitted in place of the original slotted flaps. The top speed figure is optimistically published as 500 km./m. (310 m.p.h.), but this, like other data, must be presumed to have originated in the Dornier publicity office rather than the technical department.

Death of Lt.-Col. Muirhead

WE regret to have to record the death of Lieut.-Col. A. J. Muirhead, M.C., M.P., late Parliamentary Under-Secretary for Air. He was found dead in his bed on October 29. Born in 1890, he was educated at Eton and Oxford. During the last war he served in France and Italy with the Oxfordshire Yeomanry, was mentioned in despatches three times, and won the Military Cross and Bar. In 1929 he entered Parliament as Conservative Member for Wells.

In 1931 he became Parliamentary Private Secretary to the Minister of Agriculture, and afterwards served in the Ministry of Labour. In 1937 he succeeded the late Sir Philip Sassoon as Under-Secretary for Air, and last year introduced the Air Estimates. In May last year he was transferred to the same position in the India and Burma Office. On the outbreak of war he took up his duties as Commanding Officer of the 100th (Worcestershire and Oxfordshire Yeomanry) Army Field Brigade, R.A. He had gone to his home for the week-end, and died before rejoining his unit. Col. Muirhead was unmarried.

Germany's Aluminium Supplies

THE seizure by the British Navy recently of 15,500 tons of alumina as contraband bound for Germany focuses attention on the extent to which the Reich is dependent on foreign supplies of this metal, which is vital to her aircraft industry.

Germany, the largest consumer of aluminium among world Powers in 1938, had to import almost all her supplies of bauxite, the ore from which the metal is obtained. Compared with a total of nearly 1,200,000 tons imported last year, rather less than 18,000 tons were home-produced in Germany. About 60 per cent. of these imports came from Jugo-Slavia and Hungary.

Important supplementary supplies of bauxite were imported from the Dutch East Indies (190,000 tons), France (90,000 tons), and Greece (83,000 tons). Italy last year exported only 90,000 tons to Germany.

The Nazi air force is, therefore, faced with a considerable immediate reduction of her resources of aluminium, which is, of course, universally employed in the construction of high-speed aircraft, and without which adequate replacement of first-line planes is seriously impeded. On the basis that four tons of bauxite are required to produce one ton of aluminium, it is calculated that Germany, which last year produced 130,000 tons of aluminium, stored during that period some 680,000 tons of ore. Much of this, which in any case cannot meet the tremendously increased war demand, is used in German warship construction and, of course, general armaments production.

R.Ae.S. and the War

AT the outbreak of war, the Council of the Royal Aeronautical Society had to make important decisions concerning the general policy of the Society. The archives of the Society have been moved to a place of safety in the country, but No. 4 Hamilton Place is kept open and Capt. Pritchard, the Secretary, remains in charge. Some of the rooms, including the library, are available for the use of members and it is hoped that they will make as much use as possible of No. 4 Hamilton Place.

The lecture programme for the session has, of course, been cancelled, but the Wilbur Wright lecture will be given in May of next year.

In a letter to members of the Society, the President, Mr. A. H. R. Fedden, expresses the thanks of the Society for the generosity of a large number of members of the aircraft and allied industries which has enabled the sum of £106,204 to be collected. A complete list of the subscriptions towards the funds of the Society will be published in the November issue of the Journal of the Society.

Personal Insurance

FROM Capt. A. G. Lamplugh we learn that the British Aviation Insurance Co., Ltd., has received a number of enquiries from holders of personal accident policies who have undertaken some form of Service flying obligations and who are anxious to know their position in respect of insurance. He points out that although obviously normal aviation personal accident insurance cannot be extended to include the risks of death or injury in action, many pilots, particularly among the older pilots with dependants, have undertaken duties which do not involve actual combat risks. It has been decided in fairness to such pilots that, subject to particulars of the type of flying involved being supplied, the normal scope of the personal accident policy may be extended to cover Service flying, probably at a small extra premium.

COMMERCIAL AVIATION

TEMPORARILY IMMOBILISED: Douglas DC3s and DC2s of the K.L.M. in a hangar "somewhere in Holland." It is hoped that most of these machines will soon be able once more to go about on their lawful occasions.

NEW MAIL AND NEWSPAPER SERVICES

"A. Viator" on Reintroduced Services to the Continent : Imperial Airways and the B.E.F.

THIS week's good news for civil aviation is the introduction of surcharged air mail on Dutch and Belgian air routes, which means connection with numerous other countries. The old blue air mail label is to be used if available, otherwise "By Air Mail" may be written prominently in the top left-hand corner. To prevent delay the label is recommended, however.

Cities served are Brussels, Amsterdam, Oslo, Stockholm and Helsinki and, of course, Paris by Imperial Airways and Air France.

This is indeed a boon to business people, because up to now air mail was reaching this country from Holland and Belgium whereas return mail was meandering forth by boat, which was absurd. One sincerely trusts that censorship restrictions will do nothing to make this scheme abortive.

Big-Hearted Adolf—clever if not very clean—has consulted his Crazy Gang, and of course his pet crystal-gazing crone, and the result is an expeditionary force of heavily armed, but by no means enthusiastic, soldiery to these hospitable shores. They are to travel by air and end up with a trick parachute descent, which reminds me that the Italians in Ethiopia caused pigs and such to be parachuted to the troops below.

This idea of the Funny Little Man's should give a brisk business opening for some enterprising air transport company, who could guarantee to bring them, at so much a head plus excess baggage on their ironmongery, right to their destination, the prison camp.

The German Navy must be proud of the submarine Commander who tried to order an American skipper to rescue everyone *except* some invalid soldiers from a sinking vessel. True they were combatants, but what, Herr Kapitan, are the crews of the only surface vessels of German origin we ever see near our coasts, the airmen in rubber boats who are numerous enough to be quite a nuisance?

What, if not combatants, will you and your crew be when you receive the ancient order of the Under Sea Boot from a hearty depth charge which kicks your pirate craft to the surface in a derelict condition? But fear not, Fritz, we shall pick you up, and with quaint old-fashioned courtesy treat you as an officer and a gentleman.

Flights over Berlin are becoming so common these days that we really ought to start something novel in the way of joy rides for passengers. They might see General Goering cowering unter den Linden and they could be allowed to compose and drop their own leaflets. Fair play however would have to be insisted on, and leaflets would not have to be weighted with flat-irons. Iron is so sought after in Berlin that if Uncle Herman picked one up he would wear it proudly round his neck on a broad, coloured ribbon.

Uncle Herman's own special organ—no, not the floating kidney, but the *National Zeitung*—preaches dreadful air war against England, but I wonder how many semi-deluded Germans are now guessing uneasily about the return visits of our R.A.F., who are not exactly the boys to fail to repay any little courtesies the *Luftwaffe* may offer.

Incidentally, the trembling Editor of the *Nat: Zeitung* is said to have been told to refer in future to National Sovietism, which is not an article for export as there are no customers abroad. When the Herr Ed. queried the order, he was told to put a Nat. Soc. in it.

30,000 Circulation

Imperial Airways have arranged a special daily newspaper plane to carry about 30,000 British papers to France for the B.E.F. Its return load will probably be vegetables, especially some of the sorts grown only in France and regarded here as luxuries. If the authorities don't get hold of them and pool them inextricably with carrots and onions, the idea is an excellent one.

Protests have been made to Chile that posters have appeared showing Hitler as a monkey, which, a slogan on the poster says, is a pure Aryan. It is most unfair, of course, for who can be quite sure that either party is pure Aryan? The German Ambassador is quite right to protest and so, says neutral Chile, is the Grand Master of the Society for the Protection of Oppressed and Insulted Apes.

Radio Hombog the other day called up, by name, the airport from which neutral air lines are operating in England and threatened to visit us. The visit will thus be no surprise, but perchance the visitor may hear—and feel—something to his disadvantage.

It seems a pity to threaten neutral air companies in this way, and Radio Hombog might remember that there are civil air routes in operation in Germany which are not neutral, but operated by our old pals D.L.H.

This company operates Berlin-Danzig-Königsberg internally, and also Sofia-Istanboul, as well as Berlin-Copenhagen-Malmö and several other lines, including Berlin-Rome and, on three days a week, a Berlin-Vienna-Budapest-Belgrade Sofia-Saloniki-Athens service.

All these being merchant services of the air, operated by the enemy, would be open to appropriate action by our R.A.F., but it would be far more sensible for all parties to agree to leave civil air transport alone. Anyway, there is no point in attacking neutral air transport.

Probably there are faint glimmerings of sense left in the heads of D.L.H., who, by reason of contact with decent people pretty regularly, had become really very nice reasonable souls. One trusts that they have not altogether lapsed into the prevailing barbarism of their part of the world.

Let us hope that they have not, for I believe that the legitimate heir to the ex-Kaiser's throne is, or was, a D.L.H. man. I have always maintained that World Peace would only be attained when it was taken out of the hands of professional politicians and handed over to the only people who understand people, *i.e.*, the Heads of Civil Aviation of all countries.

Source of Fun

But first one has to get rid of the bunch of Thugmeisters who rule Germany to-day, such fellows, for example, as poor Ribbentrop, who was an endless source of fun over here and knew he was being laughed at.

He would have loved to be Mr. Ribbonthorpe, the perfect English gentleman, but couldn't make the grade, and now, I hear, he's trying it on with the French. Since his last speech he is desirous of changing his name to M'sieu Ribben de Trop. Corked champagne of lethal vintage in which, it is understood, he peddled at one time, makes little appeal, however, to our gallant Allies.

A. VIATOR.

New Fokker for K.L.M.?

A CORRESPONDENT in Holland informs us that it is reported that the Fokker works at Amsterdam have designed a new commercial aeroplane for the K.L.M. The machine is said to be a five-engined type, with four engines (two tandem pairs) in the wings and one in the nose of the fuselage. The machine is to have accommodation for day and night flying on the Amsterdam-Batavia route and comfort rather than speed has been aimed at in view of the fact that the machine will be used extensively for night flying.

A meeting was held the other day between officials of the K.L.M., the Fokkers works and the Dutch Government at Schiphol Aerodrome where the project was discussed.

Keeping in Touch

FLIGHT'S sister journal, "The Wireless World," will henceforward appear in monthly form with many more pages, at the price of 1s. Those of our readers who take a more serious interest in wireless, whether as regards technical development or the obtaining of news from distant stations, should make a point of getting a copy of this number, which appeared on October 20. It contains, among other features, a world-wide list of broadcasting stations, with information on the reception of news bulletins in English from various countries abroad; also hints on installing a new broadcast receiver, and detailed critical reviews of two sets specially suited for wartime listening.

Moscow-Stockholm

ON Saturday next, November 4, the summer air service between Moscow and Stockholm will be closed, and after a lapse of a few days, the winter air service will be opened. Hitherto there has been no regular winter service on that route.

From the date the air line began to operate, May 3, 1939, to the present time, 140 flights have been made, the aeroplanes carrying passengers and mail and taking seven hours to cover the distance between the two cities. The machines used by the Russian line are of the PS-84 type, while the Swedish company has used Junkers Ju.52. The winter service will consist of two flights per week from each city, the machines leaving Moscow on Tuesdays and Thursdays and Stockholm on Fridays and Sundays.

Pan-American's New Order

PAN-AMERICAN AIRWAYS have placed an order with the Boeing Aircraft Co. for six more Boeing 314 Clippers similar to the six which were delivered this year and which have been in service on the Atlantic and Pacific. The additional fleet of Boeing Clippers will, it is stated, enable Pan-American Airways to increase its trans-Atlantic service from two weekly to four weekly round trips. It will also make possible the use of all-Boeing equipment on the trans-Pacific service to China and it is believed that the same type of aircraft will be used on the weekly service to New Zealand.

Pan-American's other equipment will presumably in that case be used on the South American routes, on which the distances are shorter.

Work on the new Clippers is to be started as soon as the raw material can be obtained.

Trans-Canada Air Progress

TRANS-CANADA AIR LINES is acting as its own general contractor in the construction of the Company's hangar at Moncton, N.B., in preparation for the extension of the flying route eastwards from Montreal. Tenders received were higher than the cost of hangars built by Trans-Canada Air Lines at other airports. Sub-contracts have been awarded, and work is already under way. Extension of the Winnipeg hangar has been completed, and it is expected that the hangar at St. Hubert, Montreal, will be completed before winter sets in. Trans-Canada Air Lines is co-operating with the Canadian Department of Transport in the construction of the apron and the runway in front of the building at St. Hubert.

With the return to Standard Time, Trans-Canada Air Lines has made changes in its time-tables. The trans-Continental planes now leave Montreal daily at 9 p.m., Ottawa at 10 p.m. and Toronto at 10.30 p.m., arriving Vancouver 11.34 a.m. Pacific time the following day. Eastbound planes take off from Vancouver at 6.15 p.m., arriving Montreal 12.05 p.m.

"How We Fly"

ON the closing down of the Guild of Air Pilots and Navigators, the very excellent book entitled *How We Fly* is now being handled by Virtue and Co., Ltd., of 19, 20 and 21, Thavies Inn, London, E.C.1.

Originally issued at 7s. 6d. the price has been reduced to 3s. 6d., and copies can be ordered either direct from Virtue and Co., Ltd., or through a bookseller.

SERVICE AVIATION

Royal Air Force and Official Announcements

Awards

HIS MAJESTY THE KING has been graciously pleased to approve of the undermentioned awards for gallant and distinguished services rendered in connection with the operations in Waziristan during the period December 16, 1937, to December 31, 1938:—

Distinguished Flying Cross.

Flt. Lt. Igor William Braye.
Flt. Lt. Wilfred Edward Surplice.

Distinguished Flying Medal.

562045 Cpl. Leonard Edwin Cowan.
515389 Cpl. Eric James Fudge.

The Lion Has Wings

AT last a British company has made a good flying film. Official co-operation and a fine cast will ensure the success of *The Lion Has Wings*, now showing at the Leicester Square Theatre, not only as first-class entertainment, but as powerful propaganda.

It had been suggested that Mr. Alexander Korda, who produced the picture, was financed by the Government and that the technicians who worked on the film were not paid. This is untrue; all the actors were paid five guineas a day, except Merle Oberon, Ralph Richardson and the composer of the music, who gave their services free.

The reconstruction of the raid on Kiel by Vickers Wellingtons is notable, not so much for the cataclysmic climax of a pocket battleship being bombed, as for the intimate glimpses of the crew of the leading machine during the run-up to the target.

A Spitfire squadron (with "Wing Commander" Ralph Richardson as control officer) engages three raids and the night is rent with the flash and chatter of Brownings. Here, incidentally, occurs one of the weakest points: an enemy bomber is represented by a Focke Wulf Condor with unretracted undercarriage and other raiders are "played" by Fairey Battles. The representation of Messerschmitt fighters by R.A.F. Spitfires can, of course, be countenanced.

The glories of bygone R.A.F. displays are effectively recalled and no opportunity is lost to accentuate the might of the R.A.F. and the preparedness of England.

The cast, from the bow gunner of a Wellington to the A.O.C. in C. Fighter Command, would be difficult to better.

R.U.S.I. Remains Open

THE Members' Side of the Royal United Service Institution is open as usual, and the Journal will continue to be published and distributed. The Lecture Theatre can be made available for Service meetings on due notice being given to the Secretary. The R.U.S. Museum, however, is closed for the duration of the war.

Casualties

THE Air Ministry regrets to announce the following casualties on various dates:—

KILLED IN ACTION.—F/O. C. H. Clark, A/C.2 W. McK. Cochrane, Cpl. J. F. Drew.

KILLED ON ACTIVE SERVICE.—A.P/O. R. E. S. Brown, Sgt. J. H. Hargreaves, Sgt. H. Letchford, Sgt. W. E. Levitt, A/C.1 F. H. May, A/C.1 W. A. J. Powell, A/C.2 J. Warry, Sgt. G. G. Witty.

MISSING.—F/O. R. D. Baughan, Acting Sgt. F. G. Bryant, Wing Cdr. H. M. A. Day, Sgt. R. E. Herd, A/C.1 A. F. Hill, A/C.2 F. G. Holler, Sgt. P. E. B. Sproston, Sgt. W. H. Stephens, A/C.1 D. L. Thomas, P/O. K. G. S. Thompson, Flt. Sgt. S. Williams.

MISSING, BELIEVED KILLED.—A/C.2 W. H. Fiddock, F/O. D. Ford, Sgt. R. S. Pitts.

DIED ON ACTIVE SERVICE.—A/C.2 L. T. Brockway, A/C.2 W. J. Emery, A/C.2 R. G Lockwood, A/C.2 R. E. Montgomery, L.A/C. F. T. Price, Cpl. N. H. G. Yates.

PREVIOUSLY REPORTED "MISSING," NOW REPORTED "KILLED IN ACTION."—Flt. Lt. T. I. Davies.

£37,000 for Charity

THE Air League of the British Empire announces that the record sum of nearly £37,000 was raised as a result of the displays given on Empire Air Day this year. This is approximately double the amount realised last year. The following sums have been allocated: £19,000 to the R.A.F. Benevolent Fund; £10,000 to the R.A.F. Sports Fund; £3,200 to the Air Ministry Non-Public Funds for relieving special cases of distress; £400 to the Guild of Air Pilots Benevolent Fund and £500 to the Air Defence Cadets Central Fund.

DISTINGUISHED SERVICE has already been done by Vickers Wellington I bombers, two of which aircraft are seen over the sea in the above *Flight* photograph. The Wellington does 265 m.p.h. and is the biggest of the R.A.F.'s landplane bombers.

Royal Air Force Gazette

(Continued from "Gazette" of October 10)

Pilot Officer H. W. F. Long is transferred to the Meteorological Branch with his present rank and seniority (October 10); the notifications in the *Gazette* of September 19 concerning Brigadier-General F. L. Festing and P. V. W. Gell respectively are cancelled; the notifications in the *Gazette* of September 26 concerning M. L. Bramson, K. W. M. Pickthorn, M.P., and H. E. S. Pilcher respectively are cancelled.

Medical Branch

K. C. Donovan, M.B., B.S., M.R.C.O.G., is granted a commission for the duration of hostilities as Flight Lieutenant (September 18); D. D. MacDonald, M.B., Ch.B., is granted a commission for the duration of hostilities as Flying Officer (September 22).

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—

D. M. Wallace, M.R.C.S., L.R.C.P., W. A. S. Falla, M.B., B.S., H. A. Tracey, M.R.C.S., L.R.C.P., R. G. H. Cunningham, M.B., Ch.B., W. Hargrave-Wilson, M.R.C.S., L.R.C.P., C. R. Jenkins, M.R.C.S., L.R.C.P., D.A., B. E. Rayner, M.B., Ch.B., G. P. Arden, M.B., B.S., M.R.C.S., L.R.C.P., J. C. McC. Browne, M.R.C.S., L.R.C.P., W. H. Gossip, M.B., Ch.B., L. S. Henry, M.B., B.S., F.R.C.S. (E.), J. C. McGregor, M.B., Ch.B., K. Fawssett, M.R.C.S., L.R.C.P., C. R. Mayou, M.R.C.S., L.R.C.P., C. O. Gange, M.B., Ch.B., I. B.-K. Macgregor, M.B., Ch.B., R. J. Owen, M.B., Ch.B., W. Simpson, M.B., Ch.B., A. K. Thomas, M.B., B.S., M.R.C.S., L.R.C.P., R. E. Angel, M.B., B.S., M.R.C.S., L.R.C.P., D. M. Brown, M.B., Ch. B., R. H. Craig, M. B., Ch.B., C. Hotson, M.B., Ch.B., F.R.C.S.(E.), T. S.-B. Kelly, M.B., Ch.B., L.R.C.P. and S., L.R.F.P. and S., D. A. Ker, M.B., Ch.B., J. B. Maurice, M.R.C.S., L.R.C.P., W. Milligan, M.B., Ch.B., M.R.C.S., L.R.C.P., G. McK Gibson, M.B., Ch.B., B. J. E. Anson, M.R.C.S., L.R.C.P., L. G. Anderson, M.D., Ch.B., D.P.H., H. S. Atkinson, B.M., B.Ch., M.R.C.S., L.R.C.P., C. G. Burgess, M. B., Ch.B., P. R. Kemp, M.B., Ch.B., H. S. H. O'Conor, M.B., Ch.B., R. W. Stewart, M.B., B.Ch., M. L. Maley, M.B., B.S., M.R.C.S., L.R.C.P., H. E. Pooler, M.B. Ch.B.; B. S. Robertson, M.B., Ch.B.; K. W. Bruce, L.M.S.S.A.; D. G. Evans, M.B., Ch.B., B.S.; D. H. Le Good, M.R.C.S., L.R.C.P.; R. I. Shier, M.B., B.Ch.; G. B. Grayling, M.R.C.S., L.R.C.P.; F. G. Mundell, M.B., B.S.; J. H. Hall, M.B., B.Ch., M.R.C.S., L.R.C.P.; H. J. Davies, M.B., B.S., M.R.C.S., L.R.C.P.; D. M. Hannah, M.B., Ch.B.; R. Hill, M.B., Ch.B.; A. Wilson, M.B., Ch.B.; H. J. H. Hendley, M.B., B.Ch., M.R.C.S., L.R.C.P.; J. B. Methven, M.B., Ch.B.; F. R. Neubert, L.M.S.S.A.; J. D. Ramsay, M.B., Ch.B., M.R.C.P.; H. J. Simmons, M.B., B.Ch., M.R.C.S., L.R.C.P.; D. Skinner, M.B., Ch.B.; W. M. Cross, M.B., Ch B.; J. A. Mains, L.R.C.P. and S., L.R.F.P. and S.; T. C. Wilson, M.B., Ch.B.; J. Courtney, L.R.C.P. and S., L.R.F.P. and S., D.M.R.E. (September 23); W. Heath, M.R.C.S., L.R.C.P. (September 27); F. J. G. Jefferiss, M.R.C.S., L.R.C.P.; A. J. Owston, M.R.C.S., L.R.C.P. (October 18).

Dental Branch.

The following are granted commissions for the duration of hostilities as Flying Officers on the dates stated:—J. G. Dick, L.D.S., P. D. Law, L.D.S., E. S. Wolfson, L.D.S. (September 22); O. B. Balean, L.D.S. (September 23); M. R. Cable, B.D.S., G. W. Green, L.D.S. (September 25); S. J. Beaton, L.D.S., J. E. M. Bond, L.D.S. (September 26); E. S. Venning, L.D.S., J. R. Humphreys, L.D.S. (September 27); L. J. Wallace, L.D.S. (September 28); H. W. Harcus, B.D.S., P. L. Lamb, L.D.S. (September 29); R. C. Chamberlain, B.D.S., G. S. Furniss, B.D.S., C. E. Maguire, L.D.S., H. N. Squire, L.D.S. (October 2).

Chaplains Branch

The following are granted commissions for the duration of hostilities with the relative rank of Squadron Leader on the dates stated:—The Rev. K. T. Jenkins, B.A. (September 11); the Rev. J. L. Wright (September 29); the Rev. J. W. Malcolm, M.A. (October 2).

Meteorological Branch

The following are granted commissions for the duration of hostilities in the ranks stated (October 10):—*Squadron Leader.*—R. C. Sutcliffe. *Flight Lieutenant.*—T. N. S. Harrower. *Flying Officer.*—W. A. L. Marshall. *Pilot Officer.*—C. Wilde.

Erratum

In the *Gazette* of October 10, for Administration and Special Duties Branch read Administrative and Special Duties Branch.

Auxiliary Air Force

General Duties Branch

No. 902 (County of London) Squadron.—The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers (September 18):—W. F. Danton, W. H. Powell. No. 905 (County of Surrey) Squadron.—G. B. Gilbert is granted a commission as Flying Officer (August 29). No. 907 (County of Middlesex) Squadron.—Flying Officer J. Scrimgeour is promoted to the rank of Flight Lieutenant (September 5). No. 917 (County of Warwick) Squadron.—The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—I. H. Lawrence (June 5), N. Edyvean-Walker (August 11). No. 919 (West Lancashire) Squadron.—The following Acting Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—G. E. Harding (August 15), C. H. Ratcliffe, M.M. (August 16). No. 920 (West Lancashire) Squadron.—Acting Pilot Officer N. J. Smallthwaite is promoted to the rank of Flying Officer (August 19). No. 921 (West Lancashire) Squadron.—The following are promoted to the rank of Flying Officer on the dates stated:—Acting Pilot Officer T. A. F. Robinson (August 17), Pilot Officer N. E. Williams, D.F.C. (August 18). No. 922 (West Lancashire) Squadron.—Squadron Ldr. R. A. T. Cave-Mathieson resigns his commission (August 16). No. 926 (East Lancashire) Squadron.—R. T. Owen is granted a commission as Acting Pilot Officer on probation (August 26). No. 930 (Hampshire) Squadron.—M. E. Wilsher is granted a commission as Acting Pilot Officer on probation (August 25).

Administrative and Special Duties Branch

No. 500 (County of Kent) Squadron.—P. Reeves is granted a commission as Pilot Officer (August 30). No. 612 (County of Aberdeen) Squadron.—The Hon. H. O. Berry is granted a commission as Pilot Officer (July 2).

Equipment Branch

Flt. Lt. J. R. D. Freeman resigns his commission (October 18).

Medical Branch

No. 929 (County of Gloucester) Squadron.—J. Noble, M.B., Ch.B., F.R.C.S., is granted a commission as Flying Officer (August 30).

Auxiliary Air Force Reserve of Officers

General Duties Branch

No. 605 (County of Warwick) Squadron.—J. F. C. Brinton is granted a commission in Class C as Flying Officer (September 2).

Women's Auxiliary Air Force

Mrs. H. M. Johnson is appointed Company Commander (July 7). The following are appointed Company Assistants on the dates stated:—Mrs. C. R. Ashton, Miss M. J. G. Buchanan, Mrs. I. E. Case Beale, Miss N. C. C. Disbrowe, Mrs. D. M. E. Forbes, Miss H. M. Gibson, Miss H. C. Gray, Miss A. J. Henderson, Miss E. R. Kirkpatrick, Miss J. M. Macindoe, Miss W. B. Thompson (October 10); Mrs. F. C. Munton, Miss E. B. Murray, Miss O. A. Ramsden, Mrs. F. Richardson, Miss H. M. B. Rowan, Miss A. M. N. Stewart, Miss J. V. Waterhouse, Miss N. Winterbottom (October 12).

Air Ministry, Oct. 13.

Miss M. Y. Harvey is appointed Company Assistant with effect from June 28 and with seniority of June 6.

The following are appointed Company Assistants (Oct. 4):—Mrs. G. A. Allbrook, Miss C. M. Ambrose, Miss M. G. Ashby, Mrs. K. Biddle, Miss K. M. M. Grierson, Mrs. M. E. Hammerton, Miss V. H. Hunter, Miss E. M. Mellors, Miss J. P. Morgan, Miss F. M. Newman, Mrs. V. Rowson, Mrs. M. I. Woodhead, Mrs. A. M. Woollam.

Royal Air Force Gazette

Air Ministry, Oct. 27

Royal Air Force

General Duties Branch

The following ex-Flight Cadets are granted permanent commissions as P/O.s on probation on the dates stated:—J. H. L. Blount, G. K. R. Drimmie, J. S. B. Jones, C. Light, J. W. McKenzie, D. E. D. Milsom, P. J. M. Nettleton, D. L. Payne, D. C. Shepley, J. D. Steuart Richardson, C. Warren, T. S. Wildblood (Oct. 1); J. C. Alexander, T. R. Burne, J. S. Cameron, P. L. Chilton, J. Eadie, W. Hoy, J. C. J. Lylian, E. W. Padfield, R. J. S. Parsons, I. W. Phillips, A. M. Ruston, J. G. C. Salmond, D. W. Steventon, D. L. Wingate (Oct. 8); E. M. C. Guest, J. C. Lowe, M. C. Raban, T. P. Seymour (Oct. 9).

B. Everton-Jones is granted a permanent commission as P/O. with the effect from Oct. 7, and with seniority of July 10, 1938; Sgt. E. J. Davidge is granted a permanent commission as P/O. on probation (Sept. 27).

The following are granted short service commissions as A.P/O.s on probation for four years on the active list (Oct. 9):—A. N. R. L. Appleford, J. F. Bendix, J. E. S. Bentley, H. J. W. Black, J. W. E. Bridger, C. F. A. Capon, G. G. F. Draper, W. H. Dunne, E. R. Edmunds, B. H. Evans, D. G. Fevez, J. J. Fisher, J. H. Green, R. G. Hall, J. F. Hart, F. W. Hillman, M. Hohnen, C. L. G. Holmes, D. W. Hunt, J. H. D. Keates, D. C. Leary, B. H. McMichael, J. A. Milne, T. R. Murfitt, B. P. O'Duffy, E. D. Osborn, F. R. W. Palmer, L. F. Penny, D. Peveler, R. M. Pinkham, M. V. Redfearn Smith, P. J. E. Ritchie, T. D. I. Robison, J. T. Russell, R. E. Short, F. W. H. Simpson, S. N. Stirk, D. A. Thomas, O. V. Tracey, J. V. Verran, B. R. M. Wade, C. D. L. Wanklyn, S. M. West, G. M. Wiltshire, G. Wright.

A.P/O. on probation, L. R. Jacobsen is graded as P/O. on probation with effect from Sept. 23 and confirmed in his appointment with effect from Oct. 6.

The following A.P/O.s on probation are graded as P/O.s on probation (Sept. 23):—B. E. Bell, D. G. Belyea, C. J. A. G. Brain, J. Brain, P. G. Brodie, M. A. Craig-Adams, A. W. Dunn, R. G. Egerton, V. G. W. Engstrom, D. J. Harkness, G. B. Hawes, R. J. K. Hogg, D. F. S. Holbrook, T. C. Musgrave, A. E. P. Pim, D. K. Plum, F. H. Posener, R. A. Russell-Forbes, D. Secretan, M. E. R. Smith, L. W. Stevens, W. B. Wheelwright, A. F. M. Wilson, P. Wyatt-Smith, C. R. Wylie, W. L. Colmer.

P/O. R. E. Craven is granted the acting rank of Flt. Lt. (Aug. 4).

The following relinquish, at their own request, their present ranks whilst re-employed with the Royal Air Force, and are granted the rank of Group Capt. (Sept. 2):—A.V-M. R. P. Mills, C.B., M.C., A.F.C. (R.A.F. Ret.); Air Comdre. T. C. R. Higgins, C.B., C.M.G., (R.A.F. Ret.), Air Comdre. A. G. Board, C.M.G., D.S.O. (R.A.F. Ret.), Air Comdre. F. K. Haskins, D.S.C. (R.A.F. Ret.).

The following are re-seconded for duty with the Royal Air Force as Flt. Lts. with effect from the dates stated and with seniority of Sept. 3, 1937:—Capt. R. E. Weld (Royal Tank Corps) (Sept. 1); Capt. R. B. Pakenham (Border Regt.) (Sept. 3); Capt. K. J. McIntyre (Royal Tank Corps), Capt. P. W. Stansfeld (Royal Tank Corps) (Sept. 6); Capt. T. K. Lacey (Glos. Regt.), Capt. R. C. M. Ferrers (The Cameronians) (Sept. 7); Capt. J. W. Deacon (Worcs Regt.) (Sept. 13).

Capt. K. W. Goudie (Highland Light Infantry) is re-seconded for duty with the Royal Air Force as Flt. Lt. (Sept. 3); F/O. V. N. Clifton relinquishes his short service commission on account of ill-health (Oct. 16).

The short service commissions of the following mentioned A.P/O.s on probation are terminated on cessation of duty on the dates stated:—D. C. W.

Service Aviation

PUBLIC PARADE : Dornier Do 17 bombers "strut their stuff" during a pre-war mass fly-past. The version of the Do 17 shown has B.M.W. VI engines ; later machines, as described on pages a to 351 have Daimler-Benz inverted-vees, or B.M.W. or Bramo radials.

Fortier, E. W. Wakefield (Oct. 10); P. K. Panter (Oct. 18); R. A. Kempe-Roberts (Oct. 21).

Equipment Branch.

The following are granted permanent commissions as P/O.s on probation with effect from the dates stated and with seniority of Sept. 18:—Sgt. I. G. S. Hemming (Sept. 18); Sgt. G. H. Tebboth (Sept. 23).

The following F/O.s are promoted to the rank of Flt. Lt. (Aug. 28):—C. E. Lindsell, G. Jones, F. Gale.

Commissioned Engineer Officers

The following Warrant Officers are granted permanent commissions as F/O.s on probation with effect from the dates stated and with seniority of June 12:—C. F. Giles (Aug. 11); C. F. Howard (Aug. 26).

Commissioned Signals Officer

Warrant Officer H. Waite is granted a permanent commission as F/O. on probation with effect from Sept. 23, and with seniority of June 12; F/O. on probation A. C. Mansbridge is confirmed in his appointment (Sept. 29).

Commissioned Armament Officer.

Warrant Officer H. Walters is granted a permanent commission as F/O. on probation with effect from Oct. 11, and with seniority of June 19.

Memoranda

The permission granted to the following to retain the rank of Lt. is withdrawn on their enlistment in the Auxiliary Air Force on the dates stated:—W. W. White (June 7, 1938); S. J. Furze (July 11, 1938); G. W. Manton (Sept. 27, 1938); T. S. Brazendale (Feb. 27).

Erratum

In the *Gazette* of Oct. 3, notification concerning I. B. N. Russell, for Sept. 27, 1938, read Oct. 4, 1938.

Princess Mary's Royal Air Force Nursing Service

Senior Sister Miss E. Spensley, A.R.R.C., is granted the acting rank of Matron (paid) (Sept. 15).

The following Sisters are granted the acting rank of Senior Sister (paid) on the dates stated:— Miss E. J. Stuart (Sept. 15); Miss E. W. Griffiths (Sept 18).

Sister Miss E. M. M. Wells resigns her appointment (Sept. 30).

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

N. F. Packer is granted a commission in class A as F/O with effect from Oct. 17, and with seny. of April 4, 1934.

The following are granted commissions in Class CC in the ranks and on the dates stated:—Sqn. Ldr. (Hon Group Capt.).—Group Capt. J. Leacroft, M.C., (R.A.F., Ret.) (June 12). Sqn. Ldrs. (acting Wing Cdrs.).—Lt.Col. E. S. C. Grune (April 26); Maj. R. E. M. Cherry, M.C. (R.A.R.O.) (May 18).

Flt. Lts.—Cdr. T. H. Gledhill (R.N., Ret.) (July 30); Lt. K. I. Goodman (July 31).

The following relinquish their commissions in Class CC on appointment to commissions in the Royal Air Force Volunteer Reserve (Sept. 1):—Sqn. Ldrs.—W. B. Hellard, W. R. Collins, S. A. D Lane, A. W. Shaw, H. C. Tallboy, W. H. Day, G. A. Atkinson, L. S. Weedon, J. W. Martin, G. F. E. Harrson, J. H. Page, B. B Dowling. Flt. Lts.—F. J. Watts, A. G. Vaughan, N. B. Morphy, A. H. Welsh, J. G. Chamberlain, R. C. A. Brooke-Beer, H. F. W. Robinson, A. A. Radclyffe, I. B. Beesley, E. T. H. Hill, W. T. J. Hall, R. G. Rolfe-Rogers, A. D. Drysdale, M. E. Brown, J. H. Gurney, R. A. R. Coote-Robinson. R. H Spencer, D. E. Dempster, H. T. Andrews, J. F. Nalder, C. J. Dickinson, A. T. Wynyard-Wright, A. B. Smith, M.C., S. M. Thomas, H. G. Morrell, E. M. Newman, L. J. Anstey, J. C. Perkins, A. D. Broughton, K. L. Warrington, C. V. Kelway, W. F. Woods, H. M. Eldridge, M.C., H. M. Ferreira, T. M. Hodgson, O. S. Hinson, F. H. Bell, H. B. Wood, C. E. V. Wilkins, H. A. Whishaw, A. H. Read, M.M., C. A. Harverson, P. H. H. aBiley, M.C., A. M. Chalmers, G. W. Minto, H. A. Boniface, R. J. Copley, A. L. Fleming, M.C., W. A. Downie, J. C. H. W. Middleton-Stewart, T. C. Chamberlin, A.F.C., D. M. Rees, M.B.E., L. C. Prendergast, A. E. Masters, G. R. C. Brook, H. W. Hickey, D.S.O., H. A. S. Byrne, D. R. Sharman, M.C., E. A. Roberts, G. Austin. ***F/O.*** *(Acting Sqn. Ldr.).*—C. B. Dove. *F/Os. (Acting Flt. Lt.).*—J. T. Hall, D. J. Hughes-Morgan. *F/O. (Hon. Flt. Lt.).*—L. H. Rochford, D.S.C., D.F.C. *F/Os.*—J. G. Kerr, C. A. Moore, W. R. Kells, G. W. E. Baker, F. R. Alford, M. V. Molony, W. W. Legh-Jones, G. B. Savi, S. J. Saunders, A. G. Forbes, H. E. C Collins, D. E. P. Chaplin, J. A. Barnes, J. A. Pring, M.B.E.

Royal Air Force Volunteer Reserve

General Duties Branch

The following are granted commissions for the duration of hostilities as P/Os. on probation:—W Sterne (Oct. 13); W. M. Mackay (Oct. 14).

The following are granted commissions for the duration of hostilities as A.P/Os. on probation:—K. M. Bastin, R. F. Lumb, H. F. Welté (Oct. 8); C. N. Robinson (Oct. 11).

The notification in the *Gazette* of Oct. 10 concerning G. M. Pitts-Tucker is cancelled; F/O. the Right Hon. Viscount Hanworth relinquishes his commission on appointment to a regular commission in the Royal Engineers (July 26); P/O. B. Everton-Jones relinquishes his commission on appointment to a permanent commission in the Royal Air Force (Oct. 7).

The notification which appeared in the *Gazette* of Sept. 12 concerning the following, is cancelled:—A.V-M. R P. Mills, C.B., M.C., A.F.C. (R.A.F. Ret.). Air Comdre. T. C. R. Higgins, C.B., C.M.B. (R.A.F. Ret.), Air Comdre. A. G. Board, C.M.G., D.S.O. (R.A.F. Ret.), Air Comdre. F. K. Haskins, D.S.C. (R.A.F. Ret.).

Administrative and Special Duties Branch

P. R. C. Groves, C.B., C.M.G., D.S.O., is granted a commission for the duration of hostilities as Group Capt. (hon. Air Comdre.) (Sept. 18). (Substituted for notification in *Gazette* of Oct. 3).

The following are granted commissions in the ranks stated with effect from Sept. 1, and with seniority of the dates stated:—Sqn. Ldrs.—Flt. Lt. M. H. Butler D.F.C. (Oct. 24, 1928); Lt. W. R. Collins (March 29); F/O. C. B. Dove (R.A.F.O.) (May 6); Capt. W. B. Hellard (May 8); F/O. S. A. D. Lane (May 22); A. W. Shaw, Lt. H. C. Tallboy (May 30), Maj. W. H. Day (June 1); F/O. G. A. Atkinson, Capt. L. S. Weedon (June 7); J. W. Martin (June 12); F/O. G. F. E. Harrison (June 21); Lt. J. H. Page (June 27); Lt. B. B. Dowling (July 1). Flt. Lts.—F/O. T. C. Head (R.A.F., Ret.) (Jan. 14, 1928); Flt. Lt. J. B. P. Angel (R.A.F., Ret.) (July 22, 1929); Flt. Lt. R. W. Edwards (R.A.F., Ret.) (Oct. 27, 1930); Flt. Lt. E. S. Steddy (R.A.F., Ret.) (Oct. 1, 1935); Flt. Lt. A. E. Gliddon, D.S.M. (R.A.F., Ret.) Oct. 14, 1935); Flt. Lt. G. E. Litton (R.A.F., Ret.) (Nov. 4, 1935); F/O. R. J. Copley (Jan. 6, 1936); F/O. R. J. E. Haynes (R.A.F., Ret.) (Feb. 18, 1936); F/O. C. Hole (Nov. 1, 1936); F/O. H. A. Boniface (Jan. 27, 1937); A. B. Smith, M.C. (March 29, 1937); Lt. B. S. S. Rockey (Aug 16, 1937); F/O. H. J. Padfield (R.A.F.O.) (Sept. 26, 1938); Capt. A. T. Wynyard-Wright (Dec. 5, 1938); Capt. C. J. Dickinson (Dec. 16, 1938); Lt. J. F. Nalder (Dec. 21, 1938); H. T. Andrews (Jan. 3); Capt. D. E. Dempster (late I.A.) (Jan. 16); Capt. R. H. Spencer (Feb. 16); R. A. R. Coote-Robinson (March 13); Capt. J. H. Gurney (March 20); Sec. Lt. M. E. Brown, A. D. Drysdale (April 1); Capt. R. G. Rolfe-Rogers (April 11); Sec. Lt. W. T. J. Hall (April 24); Lt. E. T. H. Hill (April 28); H. Gott, D.S.M., W. S. A. Stewart (June 6); J. V. Edwards (June 22); I. B. Beesley (June 26); A. A. Radclyffe, Lt. H. F. W. Robinson (July 10); R. C. A. Brooke-Beer, J. G. Chamberlain, F/O. J. T. Hall (R.A.F.O.), Lt. A. H. Welsh (July 24); Lt. N. B. Morphy, A. G. Vaughan (July 26); F/O. W. H. Dunton (R.A.F., Ret.) (Aug. 14); Flt. Lt. F. J. Watts, Lt. E. A. Roberts, Capt. D. R. Sharman, M.C., Maj. E. A. Palmer, M.C., H. A. S. Byrne, Lt. Col. H. W. Hickey, D.S.O. (I.A., Ret.), Capt J. A. Pring, M.B.E. (I.A., Ret.), Lt. J. A. Barnes, D. E. P. Chaplin, Lt. H. E. C. Collins, Lt. A. G. Forbes, Sec. Lt. S. J. Saunders, G. B. Savi, G. R. C. Brook, Lt. W. W. Legh-Jones, F/O. M. V. Molony, Lt. Col. J. M. Mackenzie, D.S.O., Lt. F. R. Alford, Lt. G. Austin, Lt. E. M. Newman, Lt. A. McD. Chalmers, Maj. P. H. H. Bailey, M.C. (I.A. Ret.), Lt. C. A. Harverson (R.M. Ret.), Lt. A. H. Read, M.M., Lt. H. A. Whishaw, Lt. C. E. V. Wilkins, Capt. H. B. Wood (I.A., Ret.), Capt. W. F. Lamb (I.A., Ret.), E. A. Eveleigh-Smith, Sec. Lt. W. V. R. Nicholl, Maj. R. H. E. Pennett, Capt. L. H. Rochford, D.S.C., D.F.C., Lt. C. E. Lovick, Lt. C. D. Chapman, Sec. Lt. G. W. Minto, Lt. F. H. Bell, Sec. Lt. L. F. Joynt, G. W. E. Baker, Lt. R. H. W. Davidson, Lt. O. S. Hinson, Sec. Lt. T. M. Hodgson, Capt. H. M. Ferreira, Capt. H. M. Eldridge, M.C., C. A. Moore, Lt. W. F. Woods, Lt. W. R. Kells, Lt. C. V. Kelway, Lt. J. G. Kerr, Lt. K. I. Warrington, Capt A. D. Broughton, Capt. J. C. Perkins, Lt. T. P. Williams, Lt. L. J. Anstey, apt. A. R. Simpson (I.A., Ret.), Capt. A. C. Teesdale, Lt. E. W. Hallam, Capt. C. R. K. Crosfield (I.A., Ret.), Maj. H. G. Morrell (I.A., Ret.), F/O. S. M. Thomas, Lt. A. E. Masters, L. C. Prender-

Service Aviation

gnd. Capt. M. A. Chappell, Lt. J. C. H. W. Middleton-Stewart (I.A. Ret.), F/O. D. M. Rees, M.B.E. (R.A.F., Ret.), Capt. I. C. Chamberlin, A.F.C., F/O. D. J. Hughes-Morgan (R.A.F.O.), Sec. Lt. W. A. Downie, Flt. Lt. C. G. Mathew, Capt. A. L. Fleming, M.C. (Sept. 1).

The following are granted commissions for the duration of the hostilities as P/O.s on the dates stated:—R. W. Beresford, T. S. Dorman, A. L. Grice, H. S. Hargreaves, F. Haworth, K. C. Holloway, S. F. R. Huibert, D. R. H. Lovatt, R. Lutyens, I. R. Parry, S. V. Pearce, E. G. Pote, C. H. Smith, C. Tully, P. L. Wheeley (Oct. 5); R. C. C. Crowden, M.C., L. S. Duffill, L. N. Henderson (Oct. 6).

E. Addis is granted a commission as F/O. with effect from Oct. 17 and with seniority of May 17, 1936.

The following are granted commissions for the duration of hostilities as P/O.s on probation with the honorary ranks stated (Oct. 17):—Sqn. Ldrs. J. P. Jones, R. C. Richards, J. K. Silver, Flt. Lts. W. F. Dowsett, A. I. Roda, C. E. P. Suttle, F/O.s W. J. Branch, F. Heath, J. Schalk, J. T. Short.

The following are granted commissions for the duration of hostilities as P/O.s on probation on the dates stated.—G. F. Dugdale (Oct. 7); J. D. Heaton-Armstrong, M.V.O. (Oct. 9); B. L. Bathurst, K. McKenzie (Oct. 10); J. E. Boundy, H. H. Thomas, M.B.E., R. F. Potter, F. F. Tattam (Oct. 11); D. A. Davies, E. L. Fuller, E. M. Malone, W. L. Stewart (Oct. 12); G. W. E. M. Wuyts (Oct. 17); Lord Brownlow (Oct. 18).

The following are granted honorary commissions in the ranks stated (Oct. 3):—Group Capt.—V. S. Brown, O.B.E. Wing. Cdr.:—S. J. V. Fill, O.B.E.; F. E. Hellyer, O.B.E.; P. G. Tweedie; F. S. Wilkins. Flt. Lt.—T. J. Mammatt.

The following P/O.s on probation are confirmed in their appointments and promoted to the rank of F/O. on the dates stated:—T. H. W. Pearce (June 28); G. Lynch (July 2); C. A. J. Plant (July 16); G. W. Adams, C. S. Goode, G. R. Scott-Farnie (July 23); A. F. Trinder (July 30); W. C. J. Foster (Aug. 2); R. K. Budge, A. J. E. Forsyth, W. G. M. Money, S. G. Morgan (Aug. 6); G. E. Johnson (Aug. 7); J. W. Greenshields, C. G. Phillips, D. H. Scott (Aug. 12); F. A. Boyce, H. C. Page, C. R. Plant (Aug. 13); H. Edge, J. H. C. Hunter (Aug. 20); B. J. E. Belcher, D.F.C. (Aug. 22); C. M. Davis, K. G. P. Hendrie, J. L. Hillary, C. B. Matthews, L. C. Pharoah-Band, A. J. Spiers, H. J. Tanburn, D. O. Thomas (Aug. 22); H. D. Clevely (Aug. 25); A. J. Woodhouse (Aug. 26); R. C. Collinswood (Sept. 4) (Substituted for notification concerning these officers appearing in *Gazette* of Sept. 26); J. V. Southon (April 30); J. A. Cooper (June 24); S. W. Lewis (July 2); W. S. Dailey (July 9); I. O. Morton (July 16); A. M. Wilkinson, D.S.O. (July 23); C. C. K. Dagg, A.F.C. (July 25); C. J. Agelasto, S. H. Bingham (Aug. 4); J. F. R. B. de Sarigny, O.B.E., C. D. Griffiths, H. H. G. Lamb (Aug. 12); S. P. A. Bousfield, E. A. Dennis, M. Dodd, H. V. James (Hon. F/O.), H. M. Parsons (Aug. 13); G. P. Atkins, C. A. Procter (Aug. 14); E. S. Farrand, D. V. D. Marshall, C. P. Sheppard (Aug. 22) (substituted for notification concerning these officers appearing in *Gazette* of Oct. 3); G. R. P. Llewellyn (June 25); W. T. Blake (June 27); P. Fish (July 16); W. N. Cronshaw (July 23); J. E. Dixon-Spain, O.B.E., R. Fenner (Aug. 12); R. E. Money-Kyrle (Aug. 19); E. R. Barker, D.S.C., W. A. Butterfield (Hon. F/O.), J. R. Patterson (Aug. 22); A. Beveridge (Hon. Flt. Lt.) (Aug. 29); F. J. O. Taylor (Hon. F/O.) (Sept. 2); R. L. Smith (Hon. F/O.) (Sept. 10) (substituted for notification concerning these officers appearing in *Gazette* of Oct. 10).

The commission of P/O. on probation R. C. Michaelson is terminated (Oct. 16).

The following P/O.s on probation are confirmed in their appointments and promoted to the rank of F/O on the dates stated:—J. Ll. Jones (Hon. Flt. Lt.) (May 10); W. T. Bennett (Hon. Flt. Lt.), W. H. J. Richardson (Hon. Flt. Lt.) (June 18); D. G. Robinson (July 2); J. M. Clarke (Hon. Flt. Lt.) (Aug. 27); H. Manley (Hon. Sqn. Ldr.), A. S. Thomas, M.C. (Hon. Sqn. Ldr.) (Aug. 29); J. H. Cotton, S. V. Cowell A.F.C., W. Hamley, R. F. Hewitt, W. Walker (Hon. Sqn. Ldr.), C. D. G. Welch (Aug. 31); I. Davies (Hon. F/O.), A. C. Guyer, S. Horscroft M.C., W. W. Lendon, D. Lindsay, H. Parsons, J. W. Richards, H. Rothery, R. A. Smith (Hon. Flt. Lt.) (Sept. 1); J. A. Shaw (Sept. 2); A. F. J. Forsyth (Hon. Flt. Lt.), J. Johnson, G. Smart (Sept. 3); H. F. Browne (Hon. Flt. Lt.), F. B. Farthing (Hon. Sqn. Ldr.), G. F. Hyams, D.F.C. (Sept. 4); K. K. Horn, M.C., E. C. Rogers, N. Wood (Hon. Wing Cdr.) (Sept 5); H. L. Madge, G. M. Stephenson (Sept. 6); L. Abraham, H. F. T. Adams (Hon. Flt. Lt.), D. J. Addis (Hon. Flt. Lt.), R. Alcock, H. J. D. Arkell, H. S. Armitage (Hon. F/O.), J. J. R. Back (Hon. F/O.) H. E. Beardshaw (Hon. Flt. Lt.), W. T. Blanchard (Hon. Flt. Lt.), C. C. Brachi (Hon. Group Capt.), C. C. Brill, R. H. C. Bronsson (Hon. F/O.), C. L. M. Brown (Hon. Wing Cdr.), A. D. Button (Hon. F/O.), C. D. Chant (Hon. (F/O.), F. W. Clarke (Hon. Flt. Lt.), A. J. L. Collinson (Hon. F/O.), J. W. Collinson (Hon. Wing Cdr.), G. L. Danielson (Hon. Flt. Lt.), H. S. Davies (Hon. Sqn. Ldr.), R. G. Dawson (Hon. Flt. Lt.), G. T. Debenham (Hon. Flt. Lt.), E. B. Digby-Worsley, A. E. Druett (Hon. Flt. Lt.), F. H. D. Eades (Hon. F/O.), D. McL. Ferrier (Hon. Flt. Lt.), R. H. B. Forster (Hon. Flt. Lt.), F. Harrison (Hon. Sqn. Ldr.), D. Hay (Hon. Flt. Lt.), R. C. Hine (Hon. Flt. Lt.), T. L. Howson (Hon. F/O.), E. T. Jagger (Hon. Flt. Lt.), E. B. Jones (Hon. F/O.), G. R. Keep (Hon. Sqn. Ldr.), V. G. F. Kelly (Hon. Sqn. Ldr.), E. Knowles (Hon Flt. Lt.) P. Knowles (Hon. Sqn. Ldr.), W. H. Lamplough (Hon. F/O.), G. Lees, O.B.E. (Hon. Wing Cdr.), A. MacLennan (Hon. Flt. Lt.), J. F. McRae (Hon. Flt. Lt.), J. Meadows (Hon. Sqn. Ldr.), H. G. Morcom (Hon. Sqn. Ldr.), E. G. M. Neville (Hon. Sqn. Ldr), C. E. Nightingale (Hon. Sqn. Ldr.), W. A. Oliver (Hon. Flt. Lt.), W. F. Papworth (Hon. Flt. Lt.), R. K. Pillers, O.B.E. (Hon. Wing Cdr.), J. Pinder (Hon. Flt. Lt.), C. W. Pollock (Hon. Wing Cdr.), R. M. Pope (Hon. Flt. Lt.), D. S. Rapson, H. W. Ray, L. T. Rea (Hon. F/O.), J. W. Robertson (Hon. Flt. Lt.), A. H. Robson, O.B.E., M.C. (Hon. Group Capt.), J. Rogers (Hon. F/O.), H. W. Saunders (Hon. Sqn. Ldr.), W. J. Simons (Hon. Flt. Lt.), W. B. Walker, D.F.C., J. Whitley (Hon. Sqn. Ldr.) G. W. Whittaker, D.S.O. (Hon. Sqn. Ldr.), H. M. Wilson (Hon. Flt. Lt.), T. L. Wilson (Hon. F/O.), A. Young (Hon. F/O.) (Sept. 7); R. W. Allen (Hon. Sqn. Ldr.), C. L. Atkinson, W. H. Humphreys (Hon. F/O.), A. D. Jackson (Hon. F/O.), S. E. Kelly (Hon. F/O.), D. E. Williams, M.B.E. (Hon. Wing Cdr.), A. H. Woolcock (Hon. F/O.) (Sept. 8), J. A. Birtwistle (Hon. Flt. Lt.), T. P. Isaac (Sept. 9), E. O. Fuller, J. D. V. Holmes, V. A. Peers, N. H. Thackrah (Sept. 10), R. W. Drewett, S. E. Harvey-Barnes, T. F. Hosking, H. Maynard, E. T. Mitchell, C. W. N. Raymond (Sept. 11), W. F. Annis (Hon. Flt. Lt.), R. F. D. Hamilton (Hon. Flt. Lt.), G. R. E. Hayter, L. Henshall, M.B.E., J. A. Park (Hon. F/O.), A. E. G. Roberts (Hon. F/O.), J. Roughley (Hon. F/O.) (Sept. 13) R. A. Dimsdale (Sept 14), R. A. M. Kearney (Hon. Flt. Lt.), G. W. A. Webb (Sept. 15), T. W. E. Brogden, R. Buchanan (Sept. 16), F. Buckby (Hon. Sqn. Ldr.) (Sept. 19), P. B. Davies (Sept. 24).

Equipment Branch

Capt. G. F. Woolf is granted a commission for the duration of hostilities as Pilot Officer (Sept. 11).

Accountant Branch

The following are granted commissions as Flight Lieutenants (Sept. 1):—Flying Officer B. E. Hume-Wright. Capt. J. E. Bonham, Flying Officer L. Ritson (R.A.F., Ret.).

The following are granted commissions for the duration of hostilities as Acting Pilot Officers on probation on the dates stated:—A. D. S. Anderson, C. V. Baker, E. J. Barnes, W. Barrow, A. Barwick, L. G. Bennett, A. W. Bentley, W. R. N. Bithell, T. G. Blackwell, N. Booth, G. H. Briant, C. E. Brown, J. M. Brown, H. G. Cain P. N. Cantrill, W. E. Chapman, A. W. Coleman, G. L. Couch, R. G. Cross W. N. R. Dean C. C. Downing, J. A. Dyson, S. A. Early, H. R. Edwards, S. F. Fermor, E. G. Fish, A. R. Foggo, R. R. Galloway, R. P. Gardener, A. W. Giles, T. R. Gordon, P. W. M. Hall, N. M. W. Harris, L. O. Hart, W. A. Hazel, A. G. V. Herbert, J. M Hipsey, R. H. Jenkins, D. A. R. Kemp, W. J. Kerr, C. M. Lees, D. Leighton, W. M. Lomax, W. V. Lush, R. L. Mansbridge, C. W. Masters, D. E. R. Matthews, M. W. Monkhouse, R. Montgomerie, D. H. Pexton, H. Philcox, A. W. Plaistow, D. Quick, F. J. Searle, J. H. Serrell-Cooke, G. R. Shinner, H. A. Simmonds, E. D. St. Clair, C. W. Taylor, E. Telfer, H. A. Townshend, E. E. Wilding, J H. Wright (Oct. 9); J. B. Steward, J. A. C. Will (Oct. 10).

Medical Branch

The following are granted commissions for the duration of hostilities as Flying Officers on the dates stated:—I. S. Buchanan, M.D., B.S., M.R.C.P., N. Jackson, M.B., B.Ch., W. M. Philip, M.B., B.S., M.R.C.P., J. L. Trent, M.R.C.S., L.R.C.P. (Sept. 21); D. P. Rowe, M.B., B.S. (Sept. 23); W. J. C. Anstie, B.M., B.Ch., D. McMregor, M.B., Ch.B. (Sept. 25); J. H. P. Gauvain, M.R.C.S., L.R.C.P., M. J Lange, M.R.C.S., L.R.C.P. (Sept. 27); H. W. Whittingham, M.B., Ch.B., M.R.C.S., L.R.C.P. (Sept. 28); F. L. E. Musgrove, M.B., B.S., M.R.C.S., L.R.C.P., F. L. Patterson, M.R.C.S., L.R.C.P., D.T.M. (Oct. 2).

Dental Branch

J. H. W. Fitzgerald, L.D.S., is granted a commission for the duration of hostilities as Flight Lieutenant (Sept 23); R. R. Palmer, L.D.S., is granted a commission for the duration of hostilities as Flying Officer (Oct. 9).

Chaplains Branch

The following are granted commissions for the duration of hostilities with the relative rank of Squadron Leader on the dates stated:—The Rev. H. W. R. Cullen, B.A. (Sept. 13); the Rev. E. W. P. Ainsworth, M.A., the Rev. G. Blacktop, B.A., the Rev. G. H. C. Church, the Rev. F. W. Cocks, B.A. the Rev. R. G. E. Dodson, the Rev. K. V. Enson, the Rev. G. W. J. Gregson, B.A., the Rev. E. W. R. Guymer, B.A., the Rev. F. C. Harrison, the Rev. D. Higgins, the Rev. R. P. P. Johnston, the Rev. D. V. O'Sullivan, the Rev. N. C. E. Panton, B.A., the Rev. E. J. Pearce, the Rev. R. O. Price, B.A., the Rev. J. C. E. Reuss, the Rev. G. F. D. Smith (Oct. 10).

Auxiliary Air Force

General Duties Branch

No. 500 (COUNTY OF KENT) SQUADRON.—A.P/O. A. M. Paterson (since deceased) is confirmed in his appointment and graded as Pilot Officer (Aug. 15).

No. 613 (CITY OF MANCHESTER) SQUADRON.—The following are granted commissions as Acting Pilot Officers on probation on the dates stated:—G. Buckley (July 4); A. Kershaw (Aug. 4); P. Wilson (Aug. 14).

No. 12 BALLOON CENTRE.—Capt. G. E. Courens is granted a commission as Flying Officer (Aug. 30).

No. 501 (COUNTY OF LONDON) SQUADRON.—The following are promoted to the ranks stated (Sept. 18):—Flight Lieutenants—F/O. E. G. Titheradge, F/O. S. S. Gates. Flying Officer—P/O. C. Green.

No. 992 (COUNTY OF LONDON) SQUADRON.—F/O. G. F. McIvor is promoted to the rank of Flight Lieutenant (Sept. 18).

No. 903 (COUNTY OF LONDON) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant (Sept. 18):—E. Clayton, R. R. Goding.

No. 904 (COUNTY OF SURREY) SQUADRON.—The following Pilot Officers are promoted to the rank of Flying Officer (Sept. 18):—J. A. Banwell, T. B. Bright.

No. 906 (COUNTY OF MIDDLESEX) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant (Sept. 18):—I. G. Links, R. H. Lubbock, M.C.

No 907 (COUNTY OF MIDDLESEX) SQUADRON.—The following Pilot Officers are promoted to the rank of Flying Officer (Sept. 18):—H. Ellam. G. M. Christian.

No. 908 (COUNTY OF ESSEX) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant (Sept. 18):—J. M. W. Omand, O. O. Sayers, L. P. Bonnet.

No. 909 (COUNTY OF ESSEX) SQUADRON.—The following are promoted to the ranks stated (Sept. 18):—Flight Lieutenants.—F/O. C. T. Ashton, F/O. the Hon. H. J. A. Seely. Flying Officer.—P/O. G. A. Mitchell.

No. 910 (COUNTY OF ESSEX) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant (Sept. 18):—L. J. Blake, A. C. Kelway, J. E. Redding.

No. 921 (WEST LANCASHIRE) SQUADRON.—Flt. Lt. J. R. Milne, D.F.C., is promoted to the rank of Squadron Leader and appointed to the command of the Squadron (July 14).

No. 936 (COUNTY OF NORTHUMBERLAND) SQUADRON.—The following are granted commissions as Pilot Officers on the dates stated:—W. A. Mullins, K. Spoor. F. M. Hardy, T. Bewick (Aug. 28); C. E. Worthington, J. W. Howard (Sept. 1).

No. 937 (COUNTY OF NORTHUMBERLAND) SQUADRON.—The following are grantid commissions as Pilot Officers on the dates stated:—C. E. Lambie, M. B. Allan (Aug. 28); D. A. Lamb, V. A J. D. Lomax (Aug. 29).

No. 942 (EAST RIDING) SQUADRON.—J. A. Medd is granted a commission as Pilot Officer (Aug. 24).

No. 943 (EAST RIDING) SQUADRON.—F. K. Hutchinson is granted a commission as Pilot Officer (Aug. 21).

ENEMY AIRCRAFT

A MUCH APPRECIATED *FLIGHT* FEATURE

GREAT value has been placed upon the exclusive series of drawings and data published in recent issues of *Flight* of German military machines.

This series commenced in the issue of September 21 and has been in great demand in military and civil centres. For the guidance of those who have not studied the whole series we quote below the dates and subjects :—

THOSE HEINKEL BOMBERS	-	September 21
GERMANY'S DIVE-BOMBERS	-	September 28
FIGHTERS OF THE *LUFTWAFFE*	-	October 5
THE JUNKERS BOMBERS	-	October 12
SOME GERMAN SEAPLANES	-	October 19
"A.C." TYPES OF THE *LUFTWAFFE*		October 26

THE ATLANTIC SERVICE REFUELLED

The History and Experiences of Fifteen Contacts and Transfers of Fuel, Told by

SIR ALAN J. COBHAM, K.B.E., A.F.C.

The "Harrow" tanker as it appears from the aircraft being refuelled.

"Flight" photograph.

THE North Atlantic service this summer was operated by Imperial Airways with consistent reliability. The S.30 boats had an ample margin for their fuel range, and they carried a payload of about 2,000 lb. This service was made possible by taking advantage of refuelling in flight. Sixteen flights were made, fifteen of them being refuelled. On every occasion the tanker successfully completed the job of refuelling the S.30 boat, and the operation quickly became a commonplace procedure.

For nearly ten years my staff and I at Ford had been gradually evolving and improving a method of assisting the take-off of aeroplanes by refuelling them in the air. In other words, our principle was that the heavily laden machine should be lightly laden on the ground and thus be able to get off easily and climb to a safe operating height. The fuel would then be added, but this depended on our being able to develop a safe and speedy method of doing the job.

Gradually, by a long process of trial and error, such methods were evolved. Full-scale flying experiments were carried out between all manner of different aircraft, and Imperial Airways became interested in the project. At length it was decided that the Atlantic service of 1939 should be operated with the assistance of refuelling.

I must explain that the S.30 boats, which were a modified version of the well-known Empire type, would not have been able to cross the Atlantic with any appreciable payload without such assistance, and that even more modern and more highly powered aircraft, such as those used by Pan-American Airways on the same route, would benefit enormously if they could be refuelled.

We regarded this summer service as a final experiment which was to prove once and for all that refuelling was a practical operation that could be performed in almost any circumstances.

The Tankers

Three *Harrows* were allotted by the Air Ministry to act as tankers, and the conversion of these occupied the latter part of 1938 and the opening months of this year.

The first two tankers were shipped to Newfoundland in April, and a long story might be written of the organisation and hard work put into the job of getting these to their destination. One must pay tribute to Flt. Lt. Johnson for his great efforts and for the fact that he and his crews were ready on the airport in Newfoundland by the time the service was originally scheduled to start, on June 1st. Actually, due to one reason or another, the service did not begin until August 5th, and in the meantime the third tanker, which was destined for the Irish base on the Shannon Airport, was being used at Ford for further development work and for the training of the Imperial Airways crews. Every advantage was taken of this delay to incorporate the results of our latest improvements, and when the service opened both the Irish and the Newfoundland bases were equipped with up-to-the-minute gear.

The first crossing of the Atlantic began at Foynes on August 5th, when Flt. Lt. Tyson successfully refuelled the *Caribou*. It was in every way a trying experience, for not only was it the first occasion of its kind, but it was done in the presence of such spectators as Mr. De Valera and other members of the Irish Cabinet, Sir Francis Shelmerdine, Director-General of Civil Aviation, and several of the directors of Imperial Airways. Capt. J. C. Kelly-Rogers made a particularly quick crossing and delivered his first mails in Newfoundland the following morning. He arrived in New York the next day and reached England again on the following Friday. On this occasion he was not refuelled by our Newfoundland tanker owing to weather conditions which made it unnecessary. There was a very strong westerly wind blowing, which was of such assistance to him that, although he had not been refuelled, he was still able to land at Foynes with sufficient in his tanks to get him to Hythe. Thereafter the service was maintained with clockwork regularity, and it was refuelled on every occasion without a hitch.

We have prepared charts of the refuelling times at both bases, and these show that in general the operation took some 12 to 15 minutes. On one occasion it was actually completed in 10 minutes. Of this time, about 5 minutes was spent in making contact and getting the hose down and 7 minutes in passing the fuel. The rate of flow averaged 110 gallons per minute, which is nearly double the normal rate for ground refuelling.

Owing to the distance between the land aerodromes and the flying boat bases in both Ireland and Newfoundland the tankers were in the air for more than three times as long as they took to refuel. In future perhaps we shall have tankers operating from the same base as the receiving aircraft, thus providing greater economy.

Although we could claim now that this service has proved that our refuelling system is simple and foolproof, we have nevertheless learned a great deal from it. Our technical staff at Ford are already at work

"Flight" photograph.

Sir Alan J. Cobham, with Flt. Lt. Johnson on his right and Flt. Lt. Tyson on his left. The former was responsible for organising the Newfoundland base and the latter did the actual refuellings.

on the development of newer and better equipment than that which was carried in either the *Harrows* or the flying boats. We shall shortly be mechanising all our units so that the manual operation of the windlasses and winches will no longer be necessary.

Success in the past has been due to the fact that every detail has been considered meticulously, and this is a principle which we shall not discard. Every item of equipment which was used this summer is being inspected and considered from the point of view of possible improvements.

It was of enormous help to us to have the co-operation which was given by the staff of Imperial Airways, not only amongst the flying staff, but also on the engineering side. It may not be generally realised that the refuelling operators in the flying boats, chosen from amongst the first officers and wireless operators, had only some four hours' flying training for this job; yet they successfully completed the operation on every occasion without any supervision, having no more communication with the tanker crew than that which could be maintained by flag signals.

The eagerness of Imperial Airways' first officers and wireless operators who came to Ford for training was a great stimulus to the personnel of Flight Refuelling. We divided them into four crews, a first officer being in charge of each crew, and soon we found them competing in getting the hose down quickly.

I have said many times that the pilot of the receiving aircraft is not aware that his aircraft is being refuelled. All he has to do is to fly straight and steady, and occasionally the automatic pilot has been put into action. The tanker pilots can never tell whether "George" is being used or whether the Captain is flying the machine himself, but either will do.

However, to get back to my story, the pilot, as a rule, knows nothing about the operation. He cannot feel the contact being made, the hose being drawn down, or the contact being broken. When training the Imperial Airways' crews I piloted the receiving aircraft and on those occasions could always feel the operation taking place. There was a sensation as though I were being bumped, and the tail of my machine was wobbling up and down. I then discovered that it was not because of the drag of the hose but the exuberance of the operating crew, who were conducting a small race with the windlass and jumping about as they turned the handles. We tactfully suggested that all this was unnecessary and that the job must be taken calmly.

Many people have asked me what would happen if either pilot wanted to break contact in an emergency such as might arise if an engine failed. First, if there were time, the tanker operator would show a red flag and the receiver operator would release the nozzle from the coupling. If there should be no time for that, then the aircraft have only to part company, and as the hose tightens the load will reach a point where it automatically pulls the nozzle from the coupling. The aircraft are never locked together, and in the ordinary way the drag of the hose pipe imposes a very small load on the aircraft. If the load increases beyond that which can comfortably be handled by the flying controls, the automatic release immediately comes into action.

Our Ejector method of making contact proved itself to be undoubtedly the best system yet evolved. Originally it was conceived and designed under the Air Ministry development programme, which called for refuelling at night.

Refuelling at Night

We can foresee no difficulty in refuelling at night. Assuming that the receiving aircraft is well lit the tanker pilot would find no difficulty in formating on it in darkness. However, there was one difficulty unsolved, and that was a reliable way of making contact in the dark. We reviewed every known means of making contact in the air, and we came to the conclusion that no existing method would be reliable or simple enough in operation to be performed at night. Therefore we set to work to develop a new method whereby the pilot would have no manœuvring to do, but only to keep station.

The perfecting of the Ejector method took five months' work, and now that it is accomplished it all seems very simple; we have forgotten all about our early difficulties. The fact remains that it worked reliably and efficiently, and by this means we shall be able to refuel at night, which is an essential part of a complete refuelling service.

We feel sure that, as a result of these experiences, it should now be possible to lay down refuelling bases in all parts of the world, thereby assisting into the air aircraft carrying more payload than any which has previously operated. If this were done, subsidies would no longer be necessary and dividends on air transport shares could be paid out of true earnings. Not only that, but it would all be much safer since the hazard of a heavily laden take-off could be completely removed.

Institute of Metals

THE importance of metallurgy in the conduct of a modern war hardly needs emphasis. It is therefore good news to learn that the Institute of Metals is continuing its activities during the war. The headquarters at No. 4, Grosvenor Gardens, London, S.W.1, remain open and the library and information department are available to members. The Secretary of the Institute also points out that the monthly Journal of the Institute will continue to publish original papers and to provide abstracts.

Exit Seversky

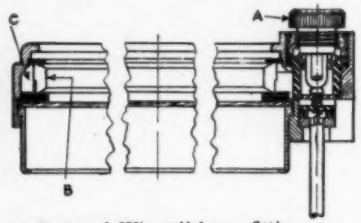
ON October 13 the Seversky Aircraft Corporation of Farmingdale, L.I., N.Y., U.S.A., changed its name to Republic Aviation Corporation. The adoption of the new name was voted at a stockholders' meeting and Mr. W. Wallace Kellett, President of the Corporation, explained that the revision of the name was the only change contemplated in the organisation. At the same time it was announced that Mr. Alexander P. de Seversky is no longer connected with the company in an executive capacity.

The Industry

"Ring" Lighting for Instruments

EVER since it was necessary to use instruments at night and, at the same time, keep the irises of the eyes wide open to perceive dim outlines in the dark, illumination of the dials has presented a difficult problem. Always, it seems, there is too much or too little light.

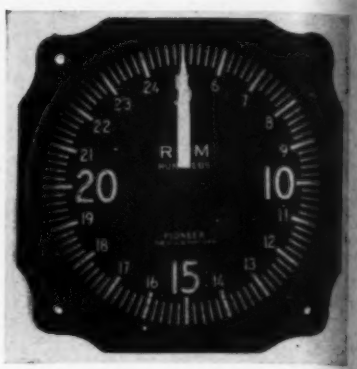
The Pioneer Aircraft Instrument Co. have spent much time and effort on producing what is known as "ring" lighting. "Ring" lighting depends upon the property of certain plastics which will transmit light through the length of a rod—be it straight or curved—made from it, if one or both ends of the rod are illuminated. The illumination in this particular instance is provided by a "grain of wheat" lamp bulb.



"Grain of Wheat" lamp fitting, removable from front of instrument (a): Inner and outer plastic rings (b) and (c).

The "rods" used are two concentric rings, the inner continuous and the outer split. The source of light is placed in the gap on the outer ring. All parts of the cover frame are black with the exception of the recess for the rings, which is white, so as to reflect back through the ring any light which strikes the white surface. The split outer ring is of rectangular section with the upper outside edge bevelled, the bevel being painted white on that half of the diameter which is farthest from the light source. The object is to ensure a uniform light distribution. The paint is tapered off to a point each end.

The inner ring is bevelled on both inner edges and slightly stepped on the outer diameter. The bevelled edge which faces the glass is black, and that which faces the dial is lacquered white. The stepped portion is painted first black then white and then, for half the diameter, blue merging into white to counteract any tendency for the light to be yellowish at the point farthest from the lamp. In addition, the graduations and pointers are painted with luminous paint.



A Pioneer engine revolution counter with "ring" lighting. The housing of the "Grain of Wheat" bulb will be seen in the top right hand corner.

Bezels and plastic rings are made in two sizes, 3in. and 1⅞in. to fit all Pioneer instruments and are available in assembled form to other makers.

S. Smith and Sons (M.A.), Ltd., Cricklewood Works, London, N.W.2, are the agents for all Pioneer products in this country.

AERONAUTICAL PATENT SPECIFICATIONS

4797. LUCAS, LTD., J., and MCGOWRAN, A. P.: Ignition apparatus for internal-combustion engines (511,360).
4854. CORNISH, A. G., KADENACY, M., and ARMSTRONG WHITWORTH SECURITIES CO., LTD.: Two-stroke cycle internal-combustion engines (511,360).
5081. BARBAROU, M. J.-B.: Device for regulating the scavenging air in supercharged two-cycle internal-combustion engines (511,505).
5083. BARBAROU, M. J.-B.: Two-stroke internal-combustion engines (511,507).
5082. BARBAROU, M. J.-B.: Scavenging and cooling of the cylinders of two-stroke internal-combustion engines (511,506).
5277. BRISTOL AEROPLANE CO., LTD., and FRISE, L. G.: Drag flaps for aeroplane wings (511,581).
5281. RIDE, T. A. F.: Vehicle lamps (511,530).
5636. AUTOMOTIVE PRODUCTS CO., LTD., and GATES, G. R. G.: Brakes for vehicles (511,300).
5677. JOHNSTONE, J. G.: Variable-speed gearing (511,371).
5812. TAYLOR, C. B.: Two-stroke internal-combustion engines (511,456).
14682. STEVENS, A. H. (Borg-Warner Corporation): Fuel-feeding means (511,315).
19143. BERRY, R. J. (Lorenz Akt.-Ges., C.): Rotating radio beacons (511,322).
21977. NUGENT, J.: Lift-increasing devices for aircraft (511,395).
35069. BECK, L. BERTELE, L., and DUSTERLOH, A.: Carburettors for internal-combustion engines (511,257).
1263. L'ORANGE, P.: Regulation of the supply of fuel to internal-combustion engines (511,406).
1300. TIPPEN, F. J.: Internal-combustion engines (511,344).
2181. KAMMER, G. S.: Two-stroke-cycle engines of the sleeve-valve type (511,479).
5831. CONSTRUCTIONS MECANIQUES DU BEARN: Valve-operating mechanism for internal-combustion engines (511,272).
8297. UNITED-CARR FASTENER CORPORATION: Nuts (511,488).

(Published August 25, 1939.)

28901. MACLAREN, O. F.: Aircraft undercarriages (509923).
2609. VICKERS (AVIATION), LTD., and WALLIS, B. N.: Aircraft landing (or alighting) gear (510,164).
2636. BENDIX AVIATION CORPORATION: Ignition magnetos for internal-combustion engines (510,169).
2741. NARDI, L., NARDI, E., and NARDI, E. (trading as INGG. FRATELLI NARDI): Bomb-release means for use on aircraft (510175).
802. MUNRO, LTD., R. W., MUNRO, R. C., and COOPER, H. G.: Pressure gauges for use in air-speed indicating apparatus (510,096).
4208. FAIREY AVIATION CO., LTD., and LOBELLE, M. J. O.: Aircraft (510,192).
19562. FAIREY AVIATION CO., LTD., and CHAPLIN, H. E.: Aircraft landing gear (510,290).
25505. SOC. D'ACCESSORIES EN TUBE POUR AUTOMOBILES (T.U.B.A.U.T.O.): Tiltable seats, in particular for a land, water or aerial vehicle (510,055).
26085. JAEGAR AVIATION: Rotary electric contact-makers (510,059).
28901. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Arrangements for maintaining a constant relative proportion between the amounts of liquid flowing through branch pipes from a main supply point (509,967).
33648. FAIRBROTHER, H. (BAYERISCHE MOTOREN WERKE AKT.-GES.): Change-speed gear for the charging compressors of aircraft engines (509,977).
34294. SAUCANT, E. J. H.: Combined protractor and calculating device for use in navigational problems (510,220).
8014. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Auxiliary frames for erecting devices for aircraft and like parts (510,147).

(Published August 31, 1939.)

29720. BRISTOL AEROPLANE CO., LTD., and FRISE, L. G.: Gun turrets for aircraft (510,538).
2949. FULLER, F. G.: Speed-indicators for use on aircraft (510597).
3005. SIEMENS APPARATE UND MASCHINEN GES.: Arrangements for varying the inclination of aircraft controlled in accordance with a gyroscopic horizon (510524).
3054. GRAVINER MANUFACTURING CO., LTD., and MATHISEN, A.: Electrically actuated fire preventing and extinguishing systems for use upon multi-engined aircraft, and devices for use in such systems (510442).
3728. WEYL, A. R.: High-lift aerofoils (510,546).
16053. ROE & CO., LTD., A. V., and TAYLOR, R. F.: Rivets and tools for removing rivets (510,482).
23145. BROOKFIELD, E.: Fuel tank for aircraft (510,383).
23557. ARADO FLUGZEUGWERKE GES.: Tank arrangement for aircraft (510,386).
26684. HIGH DUTY ALLOYS, LTD., and ALLEN, F. A.: Protection of magnesium-rich alloys (510487).
26976. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Radio-direction finders (510,394).
29996. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Apparatus for supplying air to compartments of aircraft at high altitudes (510,403).
31849. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Combustion chambers for combustion product engines (510,410).
33825. COCCON, M., and TORTA, P.: Landing-lights for aircraft (510,495).
34875. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Driving of aircraft propellers (510,418).
2304. BRITISH THOMSON-HOUSTON CO., LTD.: Vapour condensers for aircraft (510,594).

(Published September 21, 1939.)

35483. UNITED AIRCRAFT CORPORATION: Engines and method of reducing vibrations therein (511,941).
5775. RUBBRA, A. A.: Linkage mechanisms suitable for the throttle control of aero engines (511,794.)
6036. DE HAVILLAND AIRCRAFT CO., LTD., and CLARKE, K. W.: Fatigue-testing machines for materials (512,035).
6255. SIMON, M.: Aircraft (511,969).
6321. DEEKAY AIRCRAFT CORPORATION and STEEL, S.C. HART-: Shell or hollow structural members, particularly for use in aircraft and aircraft construction (511,978).
23230. MESSERSCHMITT, W.: Arrangements for sucking-off the boundary layer from aerofoils (511,650).
25206. ARMSTRONG SIDDELEY MOTORS, LTD., and LOMBARDINI, P. C.: Aeroplanes and the control thereof (511,652).
26039. SPERRY GYROSCOPE CO., INC.: Compass and like steering apparatus particularly for aircraft (511,724).

PUBLICATIONS RECEIVED

The World of Wings and Things, by Sir Alliott Verdon-Roe; 7s. 6d., Hurst and Blackett, Ltd., 36 Paternoster Row, London, E.C.4.

Great Flights, by E. Colston Shepherd; 7s. 6d., A. and C. Black, Ltd., Soho Square, London, W.1.

Die-Castings, by A. Street; Emmott and Co., Ltd., 28, Bedford Street, London, W.C.2.

The Annual of the East, 1939-1940; R. W. Brock, 160, Shaftesbury Avenue, London, W.C.2.

The Boy's Romance of Aviation, by Capt. A. O. Pollard; 7s. 6d., George G. Harrap and Co., Ltd., 182, High Holborn, London, W.C.1.

Brochure: Leicester Industrial Overture; City Development Officer, 29, Horsefair Street, Leicester.

Silent Flight, by Ann C. Edmonds; 5s., Country Life, Ltd., 20, Tavistock Street, London, W.C.2.

The Air is the Future Career, by "H. W."; 6s., Hutchinson and Co. (Publishers), Ltd., 32-36 Paternoster Row, London, E.C.4.